GIAHS Proposal

Ar Horqin Grassland Nomadic System in Inner Mongolia

Location: Ar Horqin Banner, Inner Mongolia, P.R. China

The People's Government of Ar Horqin Banner, Inner Mongolia Autonomous Region

May, 2022

Content

1. Summary Information

Name of the Agricultural Heritage System:

Ar Horqin Grassland Nomadic System in Inner Mongolia

Proposing Agency/Organization: The People's Government of Ar Horqin Banner, Chifeng City, Inner Mongolia Autonomous Region, China

Location of the site: The heritage site is located at Bayanwenduer Sumu, Ar Horqin Banner, Inner Mongolia Autonomous Region, China, including 23 Gacha (administrative villages), namely, Hailasutai, Herimu, Arihubu, Shabaritai, Manitu, Sharibaote, Daerhanwula, Bayanchagan, Talinhua, Bayanbaolege, Jibutu, Maohaoer, Armusier, Baorihot, Chaganaobao, Alatanwenduer, Debule, Harinuoer, Lagasaihua, Najie, Uridunajie, Narisutai, Yatute, 1 forest ranger station and 1 national nature reserve. The geographical position is at 119°14'00"-120°57'00" east longitude, 43°20'00"-45°14'00" north latitude.

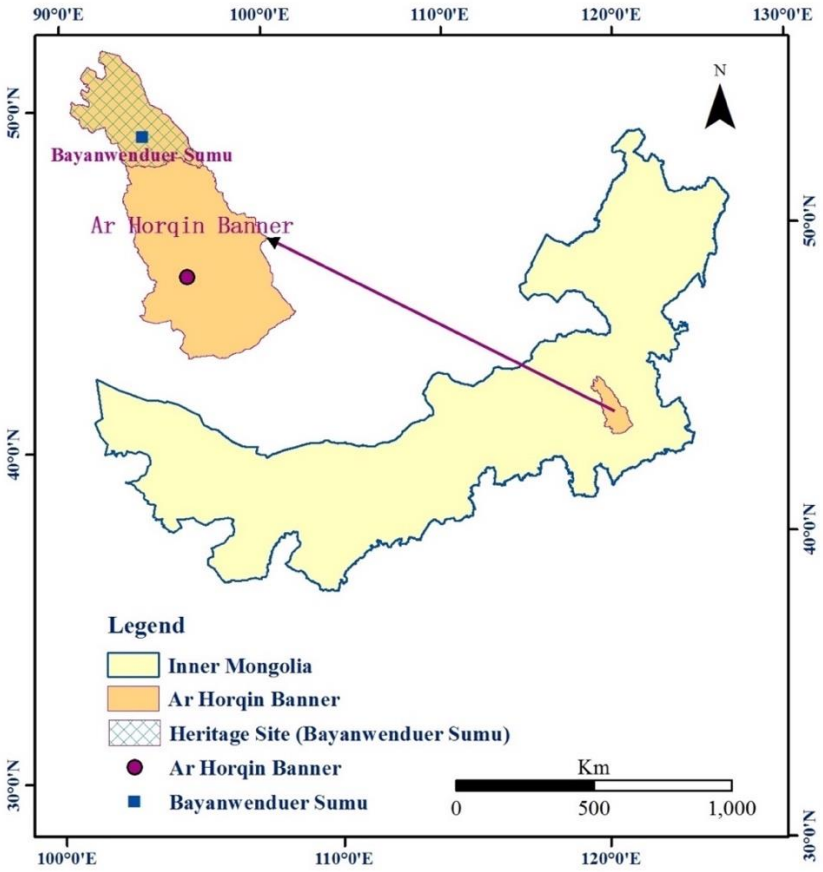

Fig 1.1.1 Geographical position map of the heritage site

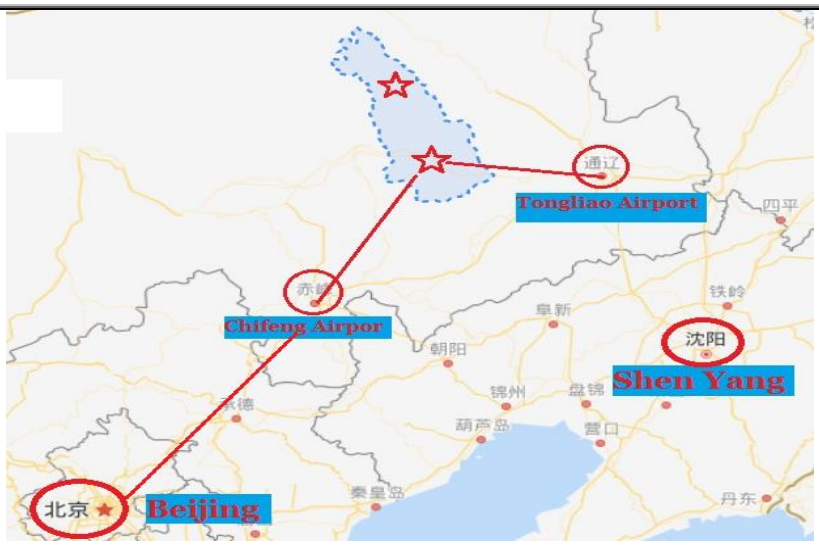

Fig1.1.2 Transportation position of the heritage site

Accessibility of the site to capital city or major cities: The heritage site is located in eastern Inner Mongolia Autonomous Region, the northernmost part of Ar Horqin Banner. The transportation of Bayan Sumu territory is mainly dependent upon highway. As for the county road, the county road in Shannan area (to the south of mountain) is made up of asphalt road and the road in Shanbei pastoral area (to the north of mountain) is earth-rock pavement. Bayan Sumu is 121km from Chabuga Railway Station in Tianshan Town, the administrative office of Ar Horqin Banner, about 2 hours and a half drive; 207km from Tongliao Airport, Inner Mongolia, about 2 hours and 49 minutes to drive; 299km from Chifeng Yulong Airport, Inner Mongolia, about 3 hours and 39 minutes to drive.

Area of coverage: 3375 km^2

Agro-ecological zones: temperate grassland in Inner Mongolia

Topographic features: The grassland of Ar Horqin Banner in Inner Mongolia Autonomous Region is located in the northern area of Chifeng City. It borders Tongliao Jarud Banner, Inner Mongolia to the east, Tongliao Kailu County and Chifeng Ongniud Banner to the south, Chifeng Bahrain Right Banner and Bahrain Left Banner to the west, West Ujimqin Banner of Xilin Gol League, Inner Mongolia and Huolin Gol City of Tongliao to the north. The whole territory is 232km long from north to south, 114km wide from east to west, with a total area of 14,277 square kilometers, in which hills and mountains accounting for 47%, slope wasteland 27%, plains 34%, others (rivers, waters) 2%. Ar Horqin Banner is the

transitional zone from the medium-height mountains of Greater Khingan Mountains to Horqin sandy land. The topography is characterized by undulating mountains, widespread hills, long and narrow plains. The northern part is mountainous area, the central and western part is hilly area, and the southeast part is Horqin sandy grassland, which appears an overall trend of high in northwest and low in southeast. The highest altitude is 1540m (Badaiailai Peak), and the lowest is 261m, with an average altitude of 430m. Xar Moron River and Xinkai River wind from west to east in the south of the territory. Ahar River, converged by multiple tributaries of Heihaer River, Sujigele River and Dalaer River, flows through the whole territory from north to south.

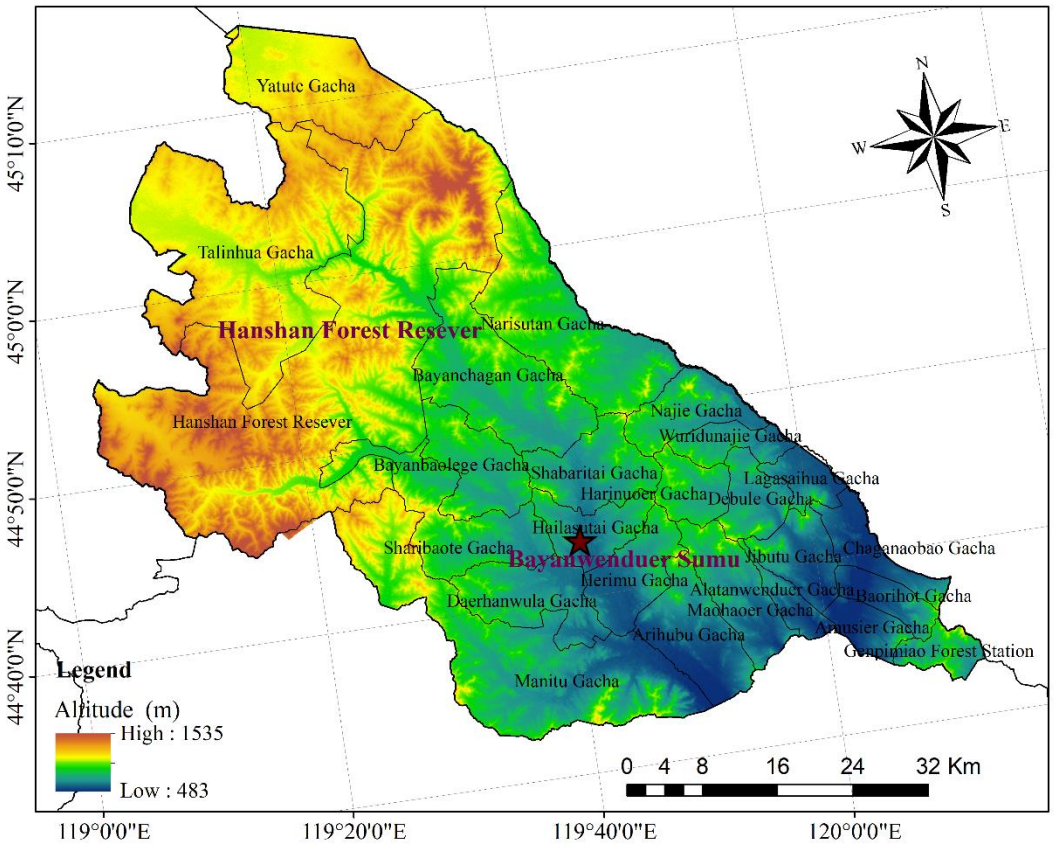

Fig 1.1.3 Topographic map of the heritage site

Climate type: The Ar Horqin Banner belongs to temperate semi-arid continental climate area. Its overall climate is characterized by: windy and dry spring with large temperature difference; short and hot summer with concentrated water volume; cool autumn, with less rainfall and abundant sunlight; cold and long winter, mostly north wind. The average annual temperature is 5.5°C, with the regional distribution of low

in the west and high in the east. The extreme maximum temperature is 40.6°C, and the extreme minimum temperature is -32.7°C. The range of annual sunshine duration is 2760-3030 hours, with the mean annual accumulated temperature reaching 2900-3400°C; the average annual rainfall is 300-400mm, with the regional distribution of more in the west and less in the east. The frost-free period is 95-140 days, which belongs to the typical temperate continental climate.

Population: 15,103 people

Ethnicity population: The Mongolian nationality occupies the dominant position, accounting for about 96.24%; the rest is the Han nationality, with a few being the Manchu and the Hui nationality.

Main sources of livelihoods: The main sources of livelihood of herdsmen in the heritage site come from animal husbandry related production, sales and a small number of services (leisure agriculture). The average annual total agricultural income of herdsmen in heritage site is 8190.26 yuan. Of which, the average annual income of herdsmen gained from the nomadic system is 68543yuan, accounting for 83.25% of the total annual agricultural income of herdsmen.

Summary Information of the Agricultural Heritage System:

The Ar Horqin grassland nomadic system in Inner Mongolia is located in the northern farming-pastoral transitional zone of China. Bayanwenduer Sumu, Ar Horqin Banner, Chifeng, Inner Mongolia Autonomous Region, with a total area of 3375 km^2, was listed in the second batch of "China National Important Agricultural Heritage", which is also the first nomadic agricultural cultural heritage in China. Here are lofty mountains, vast grasslands, densely covered rivers, and the traditional nomadic production and life style of Mongolian has been well preserved here in an original way, for example, distinguishing winter-spring camp and summer-autumn camp, settling down along those places with adequate grass and water, living on meat and cheese, horseback riding and arrow shooting.

The Ar Horqin grassland nomadic system in Inner Mongolia enjoys a long history, which is one of the birthplaces of grassland nomadic culture of Mongolian. Several sites in the Neolithic Age unearthed in the heritage site show that people

carried out hunting and nomadic production here far back in the Neolithic Age. The special natural environment also gave birth to the unique Mongolian nomadic culture, which is based on the relation of interdependence among sheep, goats, cattle, horses, camels and other livestock, also giving birth to many excellent livestock breeds with local features like Mongolia sheep, Zhaowuda beef, Hanshan white cashmere goat, Mongolian horse, Hy-line variety brown.

The Ar Horqin grassland nomadic system in Inner Mongolia has healthy ecosystem and reasonable landscape structure. The heritage site has a variety of ecosystems, such as forests, grasslands, wetlands, rivers and so on, with important ecological functions. The forests and shrubs on the hillside can conserve water, and in conjunction with the surface runoff formed by precipitation, has the functions of nourishing grasslands, promoting nutrient cycling and ensuring the domestic water of herdsmen. Grassland vegetation can also prevent wind and fix sand, conserve water and soil, and provide habitat for living beings.

The Ar Horqin grassland nomadic system has well-inherited traditional culture and moderately-innovated traditional technology. The heritage site has more than 400 ancient ruins, 3 national intangible cultural heritages, namely, Mongolian Khan Court Music, Mongolian Lele Cart Manufacturing Skills and Ariben Sumu Wedding Ceremony, and Nadam Fair, Festival Obo and other Mongolian traditional folk customs still have vitality. The traditional knowledge and technologies such as breeding improved varieties, group stocking and livestock structure contain scientific practical experience, and the simple idea of harmonious development between human beings and nature, which lasted all the time to the present age.

The Ar Horqin grassland nomadic system in Inner Mongolia is an example for global sustainable animal husbandry. To adapt to the fragile grassland ecological environment, the ancestors adopted a typical nomadic lifestyle. Using water and grass resources by moving grazing realizes the protection of vegetation and rational utilization of water resources while keeping the soil fertility not degraded, and also brings stable livestock products and diversified food to local herdsmen. The average annual income earned by herdsmen through the nomadic system accounts for 83.25% of the total income.

The Ar Horqin grassland nomadic system in Inner Mongolia is an example

for global sustainable utilization of forage resources. After years of living inheritance, the survival wisdom of herders in the heritage site is mainly embodied in the reasonable utilization of forage resources. Nomads often move regardless of winter or summer, effectively protecting the vegetation and soil fertility in arid areas. Compared with settled grazing, under nomadic mode, the above-ground biomass, underground biomass, soil organic carbon, total nitrogen and total phosphorus have a significant increase of 15.25%, 11.18%, 8.03%, 17.69% and 4.39%, respectively. Meanwhile, there are more than 640 species of herbage plants and nearly 300 species of them commonly be used as forage grass in the system.

However, with the aging of nomadic subjects, the decline of nomadic population, and the grassland degradation caused by climate change, the heritage site is also facing threats. To realize the dynamic protection of the heritage site, action plans for ecological protection, cultural inheritance, sustainable utilization and capacity building have also been formulated.

2. Description of the Proposed GIAHS

2.1 Significance of the Proposed GIAHS Site

2.1.1 Heritage location and overview

(1) Geographic position

The Ar Horqin grassland nomadic system is located at Bayanwenduer Sumu, Ar Horqin Banner, Inner Mongolia Autonomous Region, China, including 23 Gacha (administrative villages), 1 state-owned forest farm and 1 national nature reserve. The Sumu government is located in Hailasutai Gacha. The total area of the heritage site is **3375** km^2.

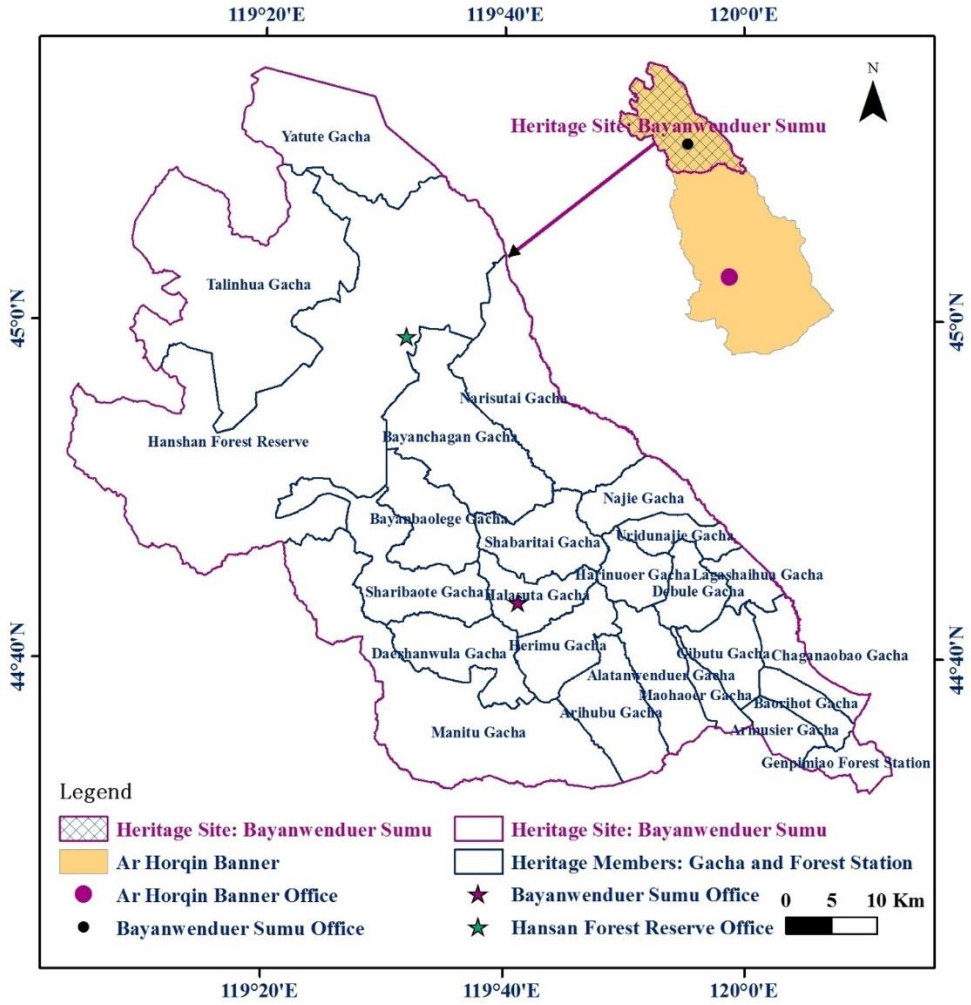

Fig. 2.1.1 Administrative map of the heritage site

(2) Ecological environment

Bayanwenduer Sumu is located in the transitional zone from the temperate semi-humid grassland in the northeast to the semi-arid grassland in the Mongolian Plateau, with complex topography and landform. The overall climate features dry spring with less rainfall and strong wind, wet and hot summer with concentrated rainfall, cool and short autumn, long, dry and cold winter. The long illumination time and the great difference of hydrothermal conditions lead to the complex vegetation types on the natural grassland and various wild plants species, with obvious zonality in its distribution. Preliminary scientific investigation has confirmed that there are 7 vegetation types and 33 formations within the region; 132 types of bryophyte,10 types of ferns and 700 types of seed plants. In addition, Bayanwenduer Sumu is also an important wildlife reserve, and there are national key protected bird Otis tarda, Ciconia nigra and other rare and endangered birds.

Bayanwenduer Sumu is a banner of traditional grassland animal husbandry, rich in livestock breeds, of which the main traditional species include Simmental cattle, Mongolian sheep, Zhaowuda mutton sheep, Hanshan white cashmere goat, Mongolian horse, donkey, etc. Through long-term evolution and adaptation, the traditional grassland nomadic ecological system with the cattle, sheep and horse as the main livestock breeds has been formed, with irreplaceable unique advantages in local animal husbandry production. On the basis of maintaining its traditional production technology and adhering to its concept of protecting ecology and caring for nature, the Mongolian nomadic system in Ar Horqin gradually integrates modern animal husbandry production technology. In particular, through the introduction of improved cattle breeds and artificial insemination technique, the purification and rejuvenation technology of sheep, natural grassland protection, artificial grassland construction, silage planting, and the implementation of a whole set of measures such as warm sheds, warm pens construction, the inevitable life cycle spell of “fat in summer, strong in autumn, thin in winter and dead in spring” in the process of livestock growth caused by the over-independence on natural conditions of traditional animal husbandry has been broken. Therefore, the traditional nomadic system can improve its openness and sustainability while maintaining its core value of “unity of heaven and

man", thus finally guaranteeing that the Mongolian nomadic system in Ar Horqin can be updated and inherited along with the development of history.

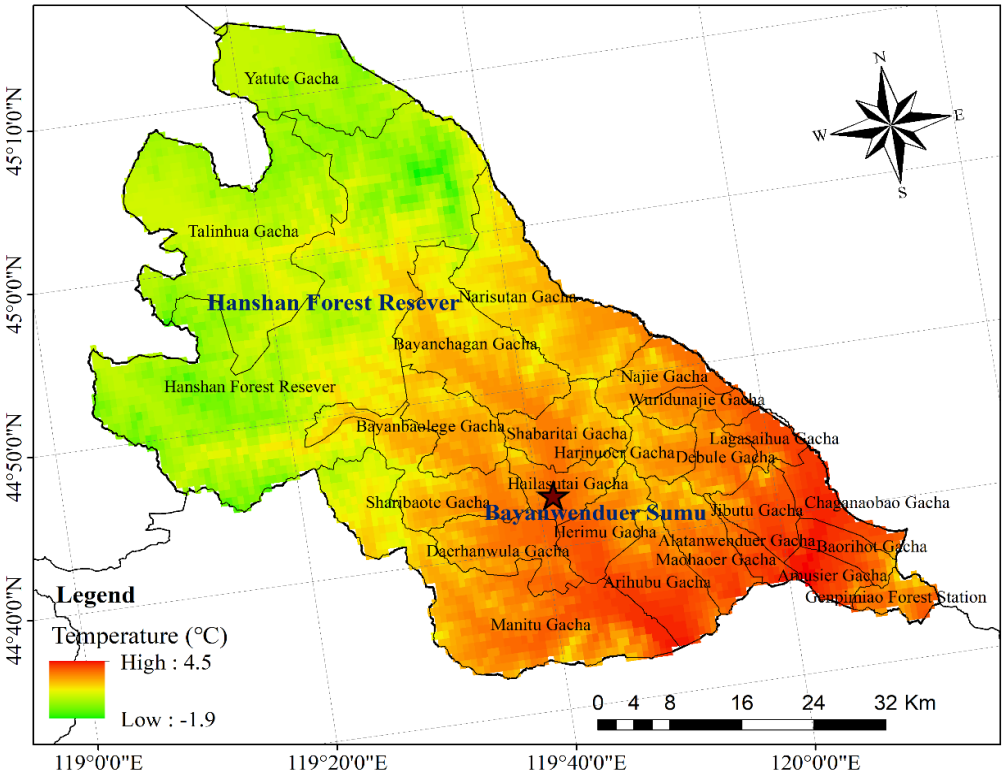

Fig 2.1.2 Average annual temperature map of the heritage site

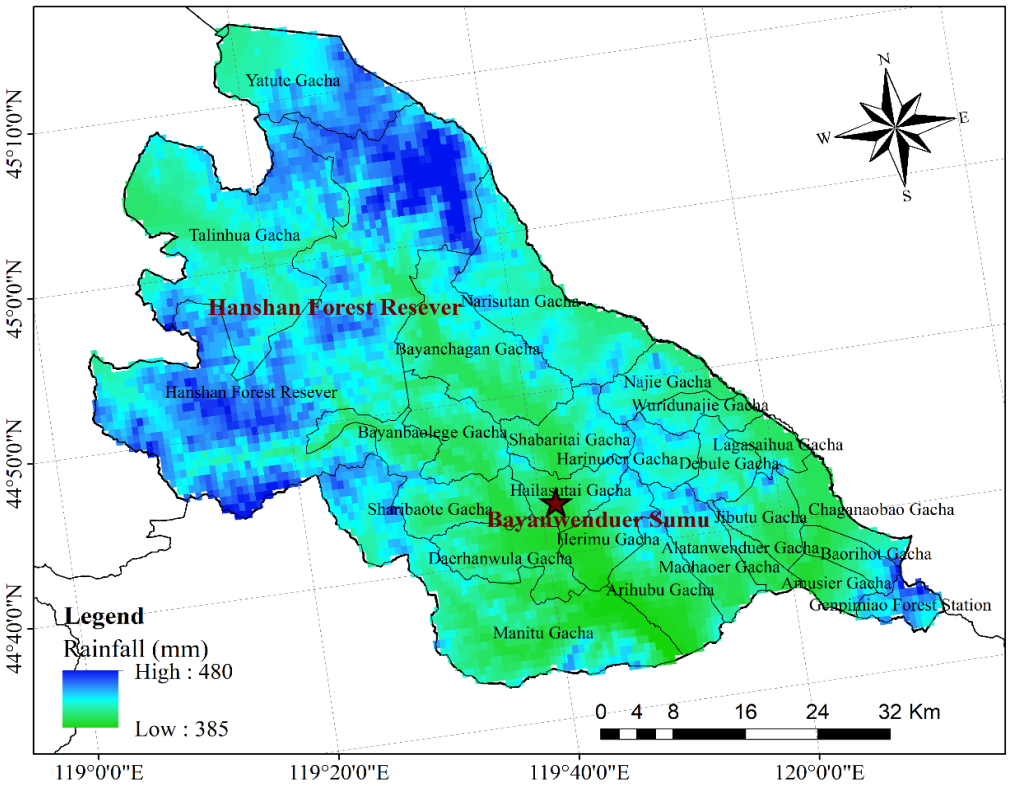

Fig2.1.3 Average annual precipitation map of the heritage site

(3) Social economy

1) Ar Horqin Banner

In 2018, Ar Horqin Banner had a total population of 292,822 people, 138,905 households in total. The Mongolian nationality and Han nationality were dominant, and the rest were the Hui nationality, the Manchu, the Korean nationality, the Daur nationality, the Ewenki nationality, the Oroqen nationality, the Zhuang nationality, the Zang nationality, the Xibe nationality, the Miao nationality, the Tujia nationality and the Yi nationality. Among them, 122,575 were engaged in the primary industry, 12,450 in the secondary industry and 10,697 in the tertiary industry.

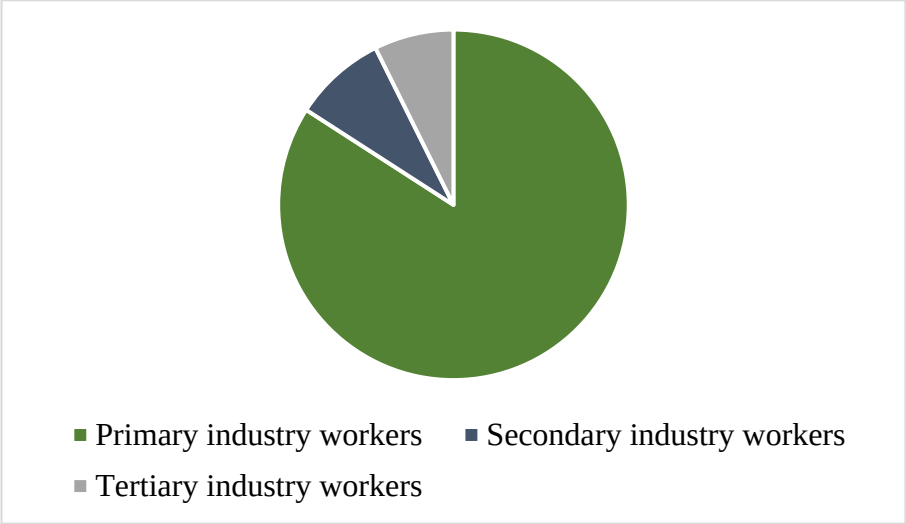

Fig 2.1.4 Numbers of residents engaged in different types of industry in Ar Horqin Banner

In terms of economic development level, the gross national product (GNP) of the whole banner was 7.64 billion yuan at the end of 2018. The added value of the primary industry was 1.85 billion yuan. Of which, the added value of agriculture, forestry, animal husbandry and fishery were 1.08 billion yuan, 79.48 million yuan, 679.25 million yuan and 9.17 million yuan respectively. The added value of the secondary industry is 2.01 billion yuan. Of which, the added value of industry is 1.26 billion yuan. The added value of the tertiary industry is 3.78 billion yuan. Of which, the added value of services of farming, forestry, animal, husbandry and fishery is 36.55 million yuan. The proportion of the three industries was 24.2 : 26.3 : 49.5. The regional per capita gross domestic product (GDP) for the whole year was 28,785 yuan, and the per capita disposable income of residents was 14,641 yuan.

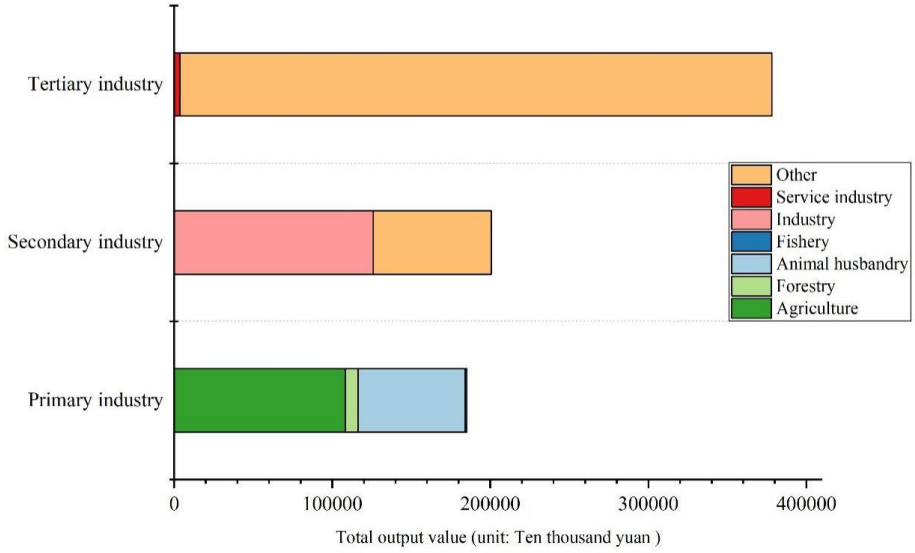

Fig. 2.1.5 Development status of three types of industry in Ar Horqin Banner

2) Heritage site

In 2018, the heritage site had a total population of 15,103 people, 5533 households in total. The Mongolian nationality occupied the dominant position, accounting for about 96.24%; the rest were the Han nationality, the Manchu and the Hui nationality. 8507 people were labors, accounting for 56.33% of the total population of the heritage site. Of which, 7690 were agricultural labors, accounting for 90.40% of the total labor force; the rest labors were mainly engaged in wholesale and retail, accommodation and catering.

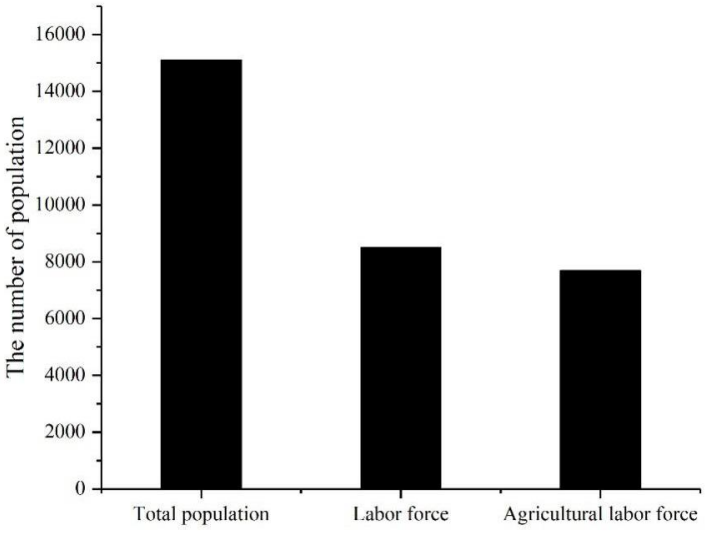

Fig2.1.6 Population profile of heritage site

In terms of animal husbandry development, at the end of 2018, the sown area of grain crops in the heritage site was 47,035.1 mu, and the total grain output was 9,968 tons, accounting for 2.88% and 1.97% of the total grain area and total output of the whole banner, respectively. At the end of June 2018, the total amount of livestock stocks in the heritage site was 575,404. Of which, the amount of large livestock stocks was 70,182; the amount of sheep stocks was 505,222. At the end of December 2018, the total amount of livestock stocks in the heritage site was 302,754. Of which, the amount of large livestock stocks was 55,625; the amount of sheep stocks was 247,129. Generally speaking, the amount of large livestock stocks in the heritage site accounts for 15.59~18.24% of that in the Ar Horqin Banner; the amount of sheep stocks in the heritage site accounts for 17.13~24.68% of that in the Ar Horqin Banner.

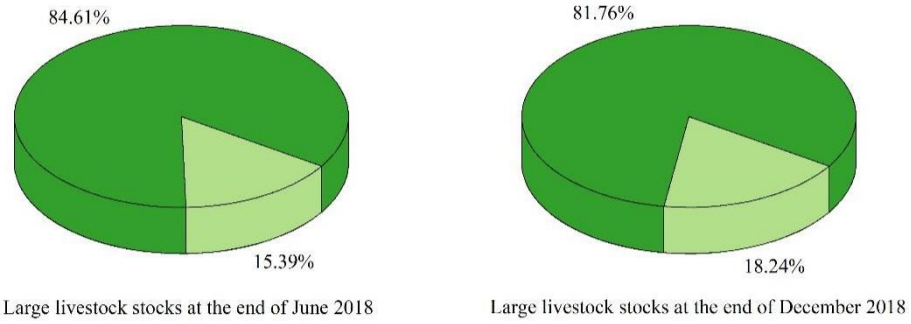

Fig. 2.1.7 Comparison of the amount of large livestock stocks between the heritage site and the whole banner

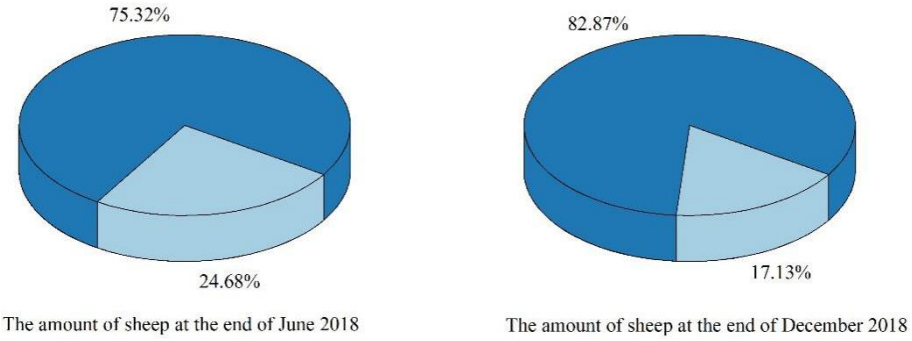

Fig 2.1.8 Comparison of the amount of sheep stocks between the heritage site and the whole banner

2.1.2 Overview of system

(1) Nomadic mode

The primitive nomadic mode of Mongolian nationality is a kind of human activity and animal husbandry management mode unitedly organized by community (tribe) that settles down along those places with adequate grass and water and moves for grazing in many years. It is an unique form of human activity that takes the production and life of herdsmen as the core, and consists of multiple elements including livestock, grassland, means of production, living supplies, as well as the gradually evolved unique ethnic and regional cultures, customs, and religions. Relying on thousands of years of experience and lessons, herdsmen understand that if they graze on a fixed grassland for a long time, livestock's repeated gnawing and trample will result in exposed soil, wind erosion and desertification, and significant degradation of above-ground vegetation, so that it will be difficult to continue grazing on this grassland. Therefore, only nomadic mode can reconcile the contradiction between natural environment and human activities, and protect scarce water resources. Rotation grazing among different grasslands can realize the sustainable utilization of water and grass resources, thus protecting the whole ecosystem diversity. Historically speaking, nomadic mode is the experience and knowledge summarized by industrious and intelligent Mongolian people through arduous explorations under the specific natural environment background. It is a kind of human wisdom and civilization obviously different from the farming culture, also an inevitable choice for the human reproduction, survival and development of Mongolian people, which has been incorporated into the blood of the Mongolians.

In the traditional primitive nomadic mode, herdsmen divided the grasslands and pastures into four different camps for grazing, i.e. spring camp, summer camp, autumn camp and winter camp according to the law of climatic change in four seasons of the year. Different camps have different grazing modes. Due to the continuous replacement by farming culture and the increasingly scarce grassland resources, the nomadic mode of the Ar Horqin grassland nomadic system has evolved from the primitive unsettled pure nomadic mode into the "settled nomadic mode". Herdsmen set up residential area at the southern foothill of the Greater Khingan Mountains with warm, comfortable climate and convenient transportation, and settle down there for a long time. In late autumn and throughout winter and spring, they carry out animal husbandry production with the settlement as the center. At this time, the livestock production is characterized by captivity principal, grazing supplemental. During the summer and early autumn, they migrate to the summer pastures for pure

grazing activities.

Every year after the Qingming Festival, ewes will give birth to lambs. To ensure the safety of ewes and lambs, herdsmen safeguard the flocks day and night. They also use felt to make felt bags, so as to put the newborn lamb into the felt bag in time for keeping it warm.

Around the Beginning of Summer, the annual great migration starts. Mongolian yurt carts, grain and oil carts, luggage carts, clothing and living supplies carts, water carts and surrounding felt carts form a long Lele cart train. Several herdsman's families go together on the horse or cart, with flocks of sheep and cattle in formidable array. On the way of transitions, two to three resting stations will be set up. At this time, herdsmen will graze livestock on the spot, set up makeshift camps, boil tea with spring water and eat millet stir-fried in butter, milk curd and air-dried beef. Every time they pass by the Obo, they will go around it for three times, present milk and food, kneel and pray, to express the deep gratitude for the gift of nature. At the grazing point of summer camp, to prevent from trampling on the grassland and causing damage, the herdsmen will set up Mongolian yurts in different places every year. In summer, with plenty of water and lush grass, the livestock will be fattened quickly, and cattle and sheep have sufficient milk. Housewives in herdsman families are busy milking the cow and making butter, yogurt, milk curd, yogurt dregs and other milk products. After the Summer Solstice, herdsmen begin to do sheepshearing, and use wool to make felt, saddle pads, surrounding felt of Mongolian yurt, Kang felt, felt shoes and felt boots. They also dress cowhide to make headstall, horselock, horsewhip and various production supplies. Skillful women sew sheepskin coats and robes, then smoke them with fire to make sure that they can keep out rain and snow, keep warm, be firm and durable. On the grasslands of midsummer, Festival Obo, Nadam Fair are held frequently. Herdsmen gather together to sing and praise the Lord, sacrifice food to Obo, chant sutras and pray with Lama. People drink freely with great joviality and enjoy the delicacy. "Three Competitions for Hero", including horse riding, wrestling and archery, bring the activities to climax. This is also a good time for young people getting married. By following the conventional steps including proposal, exchanging handkerchief, milk gold, wedding feast, bride family's feast, bride return parents' home, small return, etc., young men and women get married.

As summer fading away and autumn breezing cool, mountain flowers wither, grass and trees become golden yellow. Herdsmen are busying mowing and storing

grass, repairing the overwintering succah. It is the best time for livestock slaughter around the Mid-Autumn Festival. Herdsmen drive herds back to the settlement on the southern slope of Greater Khingan Mountains, where they prepare to spend winter and spring. After returning to the settlement, it comes to the end of autumn. The livestock is treated mainly by feeding, supplemented by grazing. Especially in heavy snow and frozen weather, livestock are unable to move on the grassland, so they are basically fed on stored forage.

Year after year, the herdsmen on Ar Horqin grassland settle down along those places with adequate grass and water, live on meat and cheese, procreate for generations without ending.

Fig 2.1.9 Herdsmen set up felt houses in the nomadic area

Fig 2.1.10 Beautiful pasture in summer

(2）Nomadic route

Herdsmen get familiar with and master the characteristics of the surrounding natural environment and rich knowledge during their long-term nomadic activities, including the distribution of mountains, rivers and lakes, the species of animals and plants and their growth, reproductive activity characteristics, seasonal changes in spring, summer, autumn and winter, and the cold, warm, dry and wet law of climate. Based on their experience accumulation for years, combining the four seasons of climate change, the distribution and quantity of water source, the growth and types of grassland, the number and species of herds and other factors, a nomadic range and migration route in four seasons of the year has been formed gradually, taking tribe (now Gacha and villager groups) as a unit.

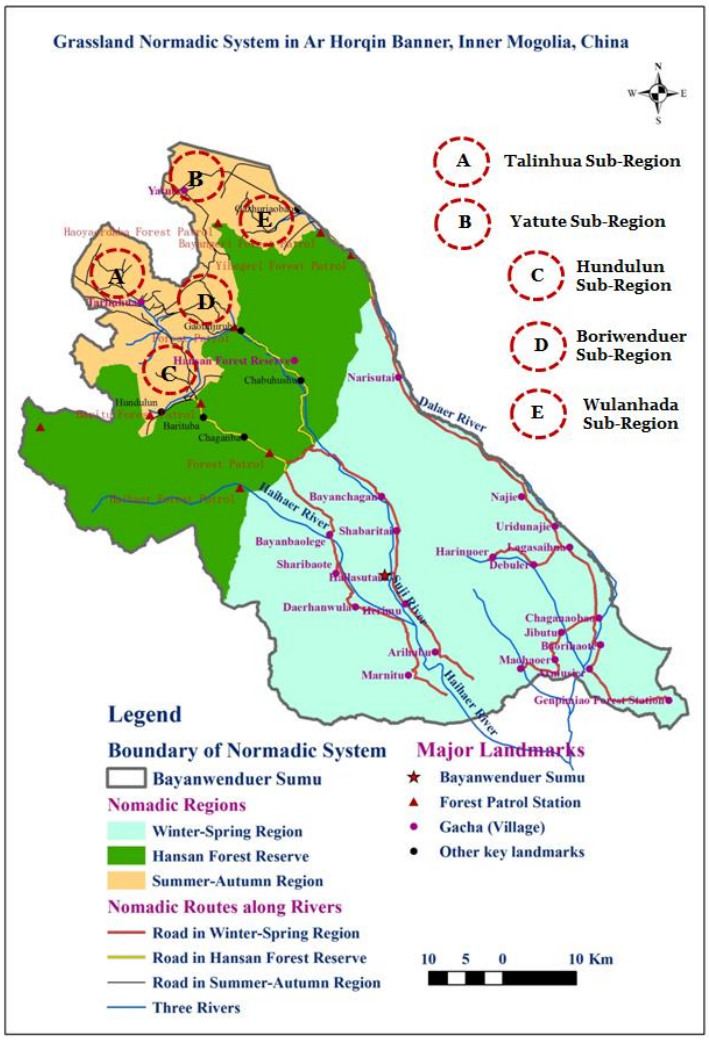

Fig 2.1.11 System nomadic route and summer camp distribution map

When nomadic season comes, the herdsmen set off from the settlement by taking Gacha or villager group as a unit, trudge upstream for one to three days along the Ural River, Sujigele River, Ahar River and their tributaries, and then reach the five nomadic sub-regions on the northern slope of the Greater Khingan Mountains, Ulanhada Sub-region, Yatute Sub-region, Baoriwenduer Sub-region, Talinhua Sub-region, Hundulun River Sub-region, respectively.

Dalaer River route: Start from several Gacha in the east such as Alatanwenduer, Baorihot, proceed northward upstream Dalaer River, pass through Najie Gacha, Narisutai Gacha, Yihegeri forest ranger station, Ganzhuer Obo, and finally reach Ulanhada, Yatute Sub-region. The migration distance is 70-110 km and lasts 2-3 days.

Sujigele River route: Start from Manitu Gacha, Arihubu Gacha, proceed northward upstream Ahar River for a while, separate the route to upstream Sujigele River, and finally reach Baoriwenduer (Yaligatu, Wotaihuidi), Talinhua Sub-region.

The migration distance is 35-70 km and lasts 1-2 days.

Ahar River route: Start from Darihan, Sharibaote, Bayanbaolege, proceed northward upstream Ahar River, pass through Chagan Obo, Baritu, Ailai River, and finally reach Talinhua Sub-region, or go west through the Hundulun River, cross the Malaga Daba Pass and enter the Chagan wendur area. The migration distance is 35-80 km and lasts 1-3 days.

Tab 2.1.1 Schedule of survey for route map from all Gacha settlements to the summer pasture in the nomadic system

Settlement	Nomadic area		Transmit route (place, mountain, river and other landmarks) and millage (km)			
Name	Name	No	First day	Second day	Third day	km
Bayanbaolege	Hundulun	2	Chagan Dam 3 Baritu Dam 4 Fire control station 5 Hundulun River 5			35
Sharibaote	Hundulun	2	Heihaer River 8 Forest ranger station 9 Baritu Dam 4 Fire control station 5			40
Darihan	Chaganwendu	15	Heihaer River 8 Forest ranger station 9	Baritu Dam 4 Fire control station 5	Hundulun 2 Malagedaba 11	70
Manitu	Chaganwendu	15	Aolimu 12 Heihaer River 8 Forest ranger station 9	Baritu Dam 4 Fire control station 6	Chagan Obo 18 Airigentu River 19	82
Arihubu	Talinhua	17	Aolimu 12 Heihaer River 8	Chagan Dam 3 Baritu Dam 4	Chagan Obo 18 Airigentu River 19	87
Herimu	Talinhua	21	Darihan 13 Heihaer River 8	Chagan Dam 3 Baritu Dam 4	Chagan Obo 18 Ailai River 19	75
Hailasutai	Ailaishaoong	23	Shabutai Aili 24 Samu Dam 25	Chagan Dam 3 Baritu Dam 4		70
Shabaritai	Yaligatu	28	Bayinchagan Aili 29 Chabuhushu 30	Suji River 31 Gaolinjiruhe 32		50
Bayanchagan	Wotaihuidi	33	Chabuhushu 30	Suji River 31 Gaolinjiru River 32		45
Amusier	Ulanhada	35	Baoditala 36 Bixibaoleng 38 Najie Aili 37	Yihegeri 39	Ganzhuri Obo Asi Dam 41	110
Baorihot	Ulanhada	35	Baoditala 36 Bixibaoleng 38 Najie Aili 37	Yihegeri 39	Ganzhuri Obo Asi Dam 41	110
Chaganaobao	Yatute	44	Baoditala 36 Bixibaoleng 38 Najie Aili 37	Yihegeri 39	Ganzhuri Obo Asi Dam 41	105
Jibutu	Yatute	44	Baoditala 36 Bixibaoleng 38 Najie Aili 37	Yihegeri 39	Ganzhuri Obo Asi Dam 41	110
Lacaihua	Yatute	44	Najie Aili 37 Bixibaoleng 38	Yihegeri 39	Ganzhuri Obo Asi Dam 41	100

Qiannajie	Ulanhada	35	Bixibaoleng 38	Yihegeri 39	Ganzhuri Obo Asi Dam 41	90
Hounajie	Ulanhada	35	Bixibaoleng 38	Yihegeri 39	Ganzhuri Obo Asi Dam 41	85
Narisutai	Yatute	44	Chaolibei 47 Yihegeri 39 Bayingeri 48	Ganzhuri Obo 40 Asi Dam 41		70
Alatanwenduer	Yatute	44	Herimu Dam 51 Bixibaoleng 38 Harichaolun Hundi 52	Yihegeri 39	Ganzhuri Obo Asi Dam 41	80
Debuli	Yatute	44	Herimu Dam 51 Bixibaoleng 38 Harichaolun Hundi 52	Yihegeri 39	Ganzhuri Obo Asi Dam 41	75
Harinuoer	Yatute	44	Baoditala 36 Najie Aili 37 Bixibaoleng 38	Yihegeri 39	Ganzhuri Obo Asi Dam 41	75
Maohaoer	Ulanhada	35		Yihegeri 39	Ganzhuri Obo Asi Dam 41	85

Tab 2.1.2 Schedule of survey for route map of typical herdsman household from settlements to the summer pasture in the nomadic system

Householder name	**Settlement**	**Nomadic area**	**Transmit route (place, mountain, river, obo and other landmarks) and millage (km)**				**Sheep**	**Cattle**	**Horse**
	Name	**Name**	**First day**	**Second day**	**Third day**	**km**	**head**	**head**	**head**
Hasichaolun	Darihan	Chaganwendu 15	Heihaer River 8 Forest ranger station 9	Baritu Dam 4 Fire control station 6	Hundulun 2 Malagedaba 11	70	520	45	83
Balajier	Darihan	Chaganwendu 15	Heihaer River 8 Forest ranger station 9	Baritu Dam 4 Fire control station 6	Hundulun 2 Malagedaba 11	70	180	36	75
Huhebala	Sharibaote	Hundulun 2	Heihaer River 8 Forest ranger station 9 Baritu Dam 4			40	410	20	68
Qinggeletu	Sharibaote	Hundulun 2	Heihaer River 8 Forest ranger station 9 Baritu Dam 4			40	1300		
Zhaorigetu	Arihubu	Talinhua 17	Aolishi Aili 24 Heihaer River 8	Chagan Dam 3 Baritu Dam 4	Chagan Obo 18 Airigentu River 19	87	120	90	
Sharibala	Arihubu	Talinhua 17	Aolishi Aili 24 Heihaer River 8	Chagan Dam 3 Baritu Dam 4	Chagan Obo 18 Airigentu River 19	87	140	35	
Amuguleng	Shabaritai	Yarigatu 28	Bayinchagan Aili 29 Chabuhushu 30	Suji River 31 Gaolinjiru River 32		50	520	150	
Renqin	Shabaritai	Baoriwenduer	Bayinchagan Aili 29 Chabuhushu 30			50	630	60	
Mingganbaiyin	Baorihot	Ulanhada 35	Baoditala 36 Bixibaoleng 38 Najie Aili 37		Ganzhuri Obo 40 Asi Dam 41	110	520	55	

2.1.3 Historical origin and evolution

As the birthplace of grassland nomadic culture in ancient China, the Mongolian nomadic animal husbandry production in Ar Horqin Banner enjoys a long history. Special geographical environment gave birth to the ancient grassland nomadic culture, with more than 5000 years of history evidenced by written records and cultural relics. Historically, this region belongs to the nomadic place for Donghu, Xiongnu, Wuhuan, Xianbei, Jurchen, Qidan and other people. Until the Jin Dynasty (1115-1234), except Jurchen and Qidan people, Mughal appeared. From the Yuan Dynasty (1271-1368), this region completely became the nomadic place for Mongolian. Therefore, since the Yuan Dynasty, Mongolians have spent their nomadic life here from generation to generation for 750 years. The development history of the region has gone through the following main stages (see Tab 2.1.3)

Tab 2.1.3 The evolution process of main historical nodes

Time		Nomadic people	Affiliated to
Neolithic period		Hunting and primitive nomadism	Primitive tribe
Spring and Autumn Period, Northern and Southern Dynasties BC 770-581		Nomadic place for Donghu, Xiongnu, Wuhuan, Xianbei people	Primitive tribe
Sui, Tang, Song, Liao, Jin, etc. 220-1271		Nomadic place for Qidan, Jurchen and Mughal people	Primitive tribe
Yuan dynasty 1271-1368		Nomadic place for Mongolian	The initial fief of Seignior of Liao, Yelv Liuge
Ming dynasty 1368-1644		Nomadic place for Mongolian	Governed by Tainingwei, Wulianghai, Huangshui
Period	Jiajing Period of Ming Dynasty 1522-1566	Mongolian, the 15th 15th generation grandson of Genghis Khan's younger brother, Hatubu Hasar, led the tribe to relocate (1546)	Enfeoffment of Ar Horqin Tribe
	Later Jin Dynasty 1616-1636	Nomadic place for Mongolian	The sphere of influence of the 35th Khan of Mongolian Empire, Ligdan Khutugtu Khan
Qing Dynasty 1636-1912		Mongolian, in the middle of Kangxi period, the land was open to cultivated and the Han nationality migrated, so the nomadic range and	Fief of the Qing Dynasty

Time	Nomadic people	Affiliated to
	the nomadic population decreased.	
Republic of China 1912—1949	Mongolian, inland migrants cultivated the Horqin grassland, so the nomadic scope and nomadic population greatly decreased.	
1949-	Mongolian, the grassland in front of the mountains are mostly cultivated, and only the grassland in the north of mountain can be used for nomadic purposes.	Bayanwenduer Sumu, 21 Gacha

Neolithic period, coexistence of hunting and primitive nomadism: Within the territory of Baolizhao, Saihantal Sumu, Ar Horqin Banner, several ruins where once human beings in the Neolithic period inhabited have been found. Several stone axes, jade axes, stone shovels were unearthed, which indicated that far back to the Neolithic period, people were engaged in hunting and nomadic production activities here, and hunting and nomadic coexisted in the whole period.

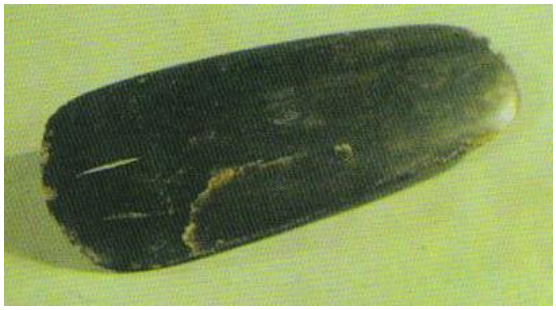

Fig 2.1.12 Stone hoe in the Neolithic period

Fig 2.1.13 Jade axe

The Spring and Autumn Period and the Warring States Period (BC 770 - BC 221), the nomadic system is in its infancy: During the Spring and Autumn period and the Warring States period, Xiongnu nationality, born and emerged in the Hetao area of the Yellow River in Monan and Yinshan Mountain (now Langshan Mountain, Daqingshan Mountain of Inner Mongolia), began to develop and grow. They seized the opportunity when the countries of the Central Plains were in a tangled fight, rose up on the Eurasian Steppes, and became the first unified nomadic people's regime in the north.

Liao and Jin Period (916-1234), the nomadic production mode prevailed: As recorded by the *History of Liao*, Qidan people took animal husbandry and hunting as

a profession, and moved with abundant water and luxuriant grass. As for Mongolian animal husbandry, according to the *Records of Qidan State*: To the north of Mongolia, the state has no monarch nor farming. People take grazing as a profession, have no permanent residence, travel in four seasons to look for places with abundant water and luxuriant grass for grazing, and take meat and cheese as the staple food. In the mural tombs of Liao Dynasty discovered by archaeologists in recent years, it can be seen from the horses, cattle and sheep living with people that at that time, animal husbandry had become the leading industry, and horses had become the main means of transportation. From the delicately carved saddle ornament, bow, arrow, paint furniture and ornament, we can see that people who lived here at that time were not only engaged in animal husbandry, but also engaged in hunting, and the handicraft industry had reached a quite high level.

Fig. 2.1.15 The Pull horse

Fig. 2.1.16 The Goat

Yuan and Ming Dynasties (1271-1644), Ar Horqin Banner established, and the nomadic system developed rapidly: In the early Yuan Dynasty, the area was enfeoffed to Seignior of Liao, Yelv Liuge, and was completely controlled by the Mongolians and became a nomadic territory inherited by Mongolians from generation to generation. In the Ming Dynasty, it was initially governed by Tainingwei, Wulianghai, Huangshui. In the 25th year of Jiajing Period of Ming (1546), the 15th generation grandson of Genghis Khan's younger brother, Hatubu Hasar, who was nomadic along the Argun River, Ahar River, Hulunbeir Lake, led the tribe, Ar Horqin Tribe, to relocate here. So this area was named Ar Horqin, with the meaning of archer of the north. In the Later Jin Dynasty (1616-1636), it was a Mongolian nomadic place under the jurisdiction of the 35th Khan of Mongolian Empire, Ligdan Khutugtu Khan. In the 8th year of Tiancong Period of Later Jin (the 7th year of Congzhen Period of Ming, 1634), several states of Mongolia grazed here and Ar Horqin Tribe set up two

banners successively.

The Qing Dynasty (1636-1912), "prohibition" in the earlier stage, "free cultivation" in the middle and later stage: In the first year of Shunzhi Period of Qing Dynasty (1644), Ar Horqin Banner was established. In th 37th year of Kangxi Period (1698), Aohan, Naiman and Haraqin banners in the south were cultivated first. Since the Qing government implemented the policy of "sharing man taxation into fields" in the early 18th century, the population of the inland increased rapidly. Due to the population surge and shortage of cultivated land in Zhili, Shandong, Shanxi and other provinces, a large number of farmers exiled outside to cultivate and seek a way to survive. Under the influence of this tide of land reclamation, some local Mongolian herdsmen also changed their pastoral land to grow grain. During the New Deal in the late Qing Dynasty, the Qing government repealed all previous reclamation bans, the wastelands of Ar Horqin Banner, Chahar Left Fourth Banner, Rehe paddock, Rehe pasture, Aohan Banner, Balin Banner, Jarud Eat Banner, Jarud West Banner were open to cultivate successively, entering an all-round free cultivation. At the end of the 33th year of Guangxu Period (1907), Ar Horqin Banner had more than 8000 hectares of arable land, and the grassland was greatly damaged.

After the foundation of the People's Republic of China, nomadic civilization was gradually integrated with modern civilization in the course of being forced: After the founding of the People's Republic of China, in order to pursue the economic development and to restore the production, a large area of grassland was reclaimed into cultivated land under the background of unilaterally emphasizing the grain output. During the period, Inner Mongolia experienced four reclamation climaxes, i.e. the economic recovery in the early founding (1949-1952), three years of natural disasters (1959-1961), ten years of turmoil (1966-1976) and the "fourth reclamation climax" raised after 1987. After nearly half a century of reclamation, the area of high quality natural grassland in Ar Horqin Banner, Jarud Banner, Horqin Right Middle Banner, Bahrain Right Banner declined sharply. The northern boundary of farming moved north close to the northwest administrative boundary of the above-mentioned banners.

2.1.4 Global importance

(1) The cradle of Mongolian nomadic culture

The Ar Horqin Tribe, originally ruled by Kundu Lundaiqing who is the seventeenth generation descendant of Hatubu Hasar, the younger brother of Emperor Taizu of the Yuan dynasty, is of the same root as Yuan Taizu. Since this Tribe began to graze their animals in the north of Hangai Mountain, it was called Ar Horqin Tribe. “Horqin” means an archer guarding the court and “Ar” means northern, so Ar Horqin refers Great Khan of the Mongol Empire as “the northern archer”. During the Jin and Yuan dynasties, this Tribe grazed their animals in the area of Argun River, Ahar River and Hulunbeir Lake. During Jiajing period of the Ming Dynasty (1546), it moved to the Xar Moron River basin at south of Greater Khingan Mountains, so their nomadic places were named after their tribe. In the 470 years of history since then, the Ar Horqin Tribe has been grazing their animals here for generations and always maintaining the traditional essence of Horqin Mongolian tribes. It is worth mentioning that after the demise of the Yuan Dynasty, the 35th Great Khan of the Mongol Empire, Ligdan Khutugtu Khan (1592-1634) built the capital “Chaganhot” in Ar Horqin and maintained its rule for 22 years（1610－1632）. The “Khan Court Culture”, which represents the essence of Mongolian culture, can be excavated and preserved today.

Here, the Mongolian horses, good at running and endurance and essential for grazing regarded by Mongolian nomads, are galloping freely on the grassland; Lele Carts necessary for the migration of Mongolian herdsmen still maintain the original state and traditional craftsmanship; Mongolian herdsmen still live in yurts in the nomadic seasons to resist rain, snow, wind and coldness and gather family warmth. In life and diet, here you can experience the creativity of Mongolian nomadic civilization and a variety of food and drinks with nomadic characteristics, such as mutton, beef and horse meat, milk from sheep, cows and horses. In spiritual culture, the Mongol nationality has kept and created the unique culture and art of Horqin Grassland, and its unique national style is reflected in many fields such as music, dancing, painting and literature. "Khan Court music" is a concentrated reflection of Mongolian people's songs and dances, vocal music, poetry, marriage, clothing, customs, etc, and with a high reputation in history, it has been spread over generations

and become an important part of Chinese culture. The ancient temples scattering in nomadic areas also reflect the unique creativity of grassland nomadic civilization. Shamanism, which the nomads believe in, is a unique religion derived from the grassland nomadic civilization and a kind of natural religious worship adapting to the nomadic production and life. It takes the animism of nature as its creed and plays an important role in maintaining the grassland national thought.

Today, the Ar Horqin nomadic people are still characterized by the Mongolian traditional production and life style of "settling down along those places with adequate grass and water and living on meat and cheese". For thousands of years, a natural interdependence and mutual restraint has been formed between herdsmen, livestock and grasslands (rivers). The unique mode of production, life style and customs, cultural traits and religious beliefs of the Mongolian people on the grassland have been bred and developed, and the life concept of advocating the will of heaven, revering the nature and the unity of man and nature hidden in the blood of Mongolian people have always been embodied. Up to now, this concept has been constantly updated, evolved and inherited with the progress of the society.

(2) The global model of pasture resource utilization

As one of China's five major pastoral areas, Inner Mongolia's grassland animal husbandry plays a very important strategic role in economic and social development and overall stability. Ar Horqin Banner is the only animal husbandry banner in Inner Mongolia Autonomous Region that retains the nomadic production mode. Grassland animal husbandry is the basic industry of economic development in pastoral areas and the main source of income for herdsmen. For ecosystem sustainability, the important wild forage plants which have been identified locally can be cultivated and acclimated into good forage grass for artificial pasture. Representative species of such wild herbage are *Agropyron desertorum*, *Poa sibirica*, *Puccinellia distans*, *Lespedeza bicolor*, *Caragana microphylla*, *Artemisia frigida*, *Vicia unijuga* and *Artemisia frigida* and so on. Herbage resources and their utilization have three typical characteristics, one of which is rich germplasm resources, high diversity, with a certain feeding value, and this is a very favorable basis for maintaining the stability

and sustainable development of natural grasslands. The second characteristic is the high proportion of wild forage plants, such as gramineae, legumes, compositae, etc., which accounts for 35% of the forage plants, and the three families of plants have wide distribution range and large biomass, which determines the higher utilization value of natural grasslands. The third characteristic is that there are many kinds of good herbage which can be used for artificial pastures and can be used for improving different types of pastures. Therefore, here is a good natural forage grass germplasm bank for intensive management of grasslands and development of animal husbandry. Besides, this model also implying how to utilize forage resources in other regions of the world.

(3) A global model of sustainable nomadic herding

Bayanwenduer Sumu nomadic system is not a traditional nomadic way of "settling down along those places with adequate grass and water", but a typical nomadic way of life integrating modern elements. Nomadism depends on social norms. The local people have very clear social boundaries, which not only clearly regulates the actions of the nomadic groups in the changeable ecological environment, but also protects the soil and water resources in the nomadic areas. There is a harmonious symbiotic relationship between this nomadic mode of life and the grassland ecology. Herdsmen make use of water and grass resources by riding horses to graze their animals, which not only ensures the soil fertility does not deteriorate, but also realizes the protection of vegetation and rational utilization of water resources. Compared with settled grazing, the above-ground biomass, underground biomass, soil organic carbon, total nitrogen and total phosphorus are significantly increased under the nomadic mode (Liu et al., 2012; Na et al., 2014; Qiu et al., 2016). In addition, while ensuring the health of pastures in the nomadic areas, excellent livestock breeds, such as cattle species, strains with local characteristics, should be bred to meet the nutritional needs of the local people, with the characteristics of strong physique and adaptability and for meat, milk and draft. Today, the nomadic system still plays an important role in the production of nomadic areas and provides stable livelihood support for the local people. It is a model of sustainable animal husbandry and ecological animal husbandry.

(4) A global model of blending ecological civilization and traditional culture

Boost farmers and herdsmen to understand the traditional nomadic system and enhance their sense of pride and protection awareness of nature and traditional culture. In the process of global economic integration today, people increasingly realized that the great material enjoyment pursued by human beings often comes at the cost of the destruction and unnecessary sacrifice of the ecological environment that human beings cannot make up for and bear. With the improvement of people's consciousness of environmental protection, when people are reflecting on and reviewing the technological progress and the achievements of civilization, they are surprised to find that nomadic civilization coincides strikingly with the strategic design and conception of today's human social economic sustainable development. The relevance between nomads and herds, which was neglected by people in the past, contains the civilized ideas and achievements most needed in the world today. Nomadic people have the fine cultural tradition and ecological custom of protecting grassland, protecting forest, protecting water source, protecting wild animals and protecting livestock. Grassland is the base of herdsmen's survival, so they attach great importance to the protection and rational use of grassland. Based on the long-term practice of animal husbandry production, herdsmen has formed the fine tradition and value system of nomadic people's ecological environment protection, which has important reference significance and practical value for how to reasonably develop and utilize natural resources to achieve the sustainable development of social economy, culture, population and resources.

2.2 Characteristics of the Proposed GIAHS Site

2.2.1 Food and livelihood security

(1) A variety of food resources

The Ar Horqin Grassland has the ideal and superior natural and geographical conditions needed for the formation of nomadic system. As early as the Paleolithic period, humans were engaged in hunting and nomadic activities in this area, which once belonged to the nomadic and hunting areas of Donghu, Xiongnu, Wuhuan and Xianbei, and later was the habitat of nomadic people in Liao, Jin, Yuan to Ming and Qing dynasties. In the 25th year of Jiajing of Ming Dynasty (1546), the Mongolian people moved here and lived a nomadic life, and then this place was named Ar Horqin Tribe. The lofty mountains, vast grasslands, dense network of rivers and other elements here, as well as the basic ecology closely connected with the farming areas, satisfy the ideal and superior natural and geographical conditions that the nomadic system should have.

The Ar Horqin Grassland nomadic system is a suitable strategy adopted by local herdsmen to adapt to the natural environment of grassland, presenting a compound production system with animal husbandry as the main part, agriculture and forestry interdependent and complementing each other in advantages. The system constitutes a relatively closed, complete, compact and self-sufficient economic unit, providing herdsmen with a variety of food and material products under the geographical conditions of inconvenient transportation. Grasslands and rivers provide abundant water and grass resources for nomadic activities all year round; forests and mountains not only provide excellent wood for nomads to make Lele carts, yurts, saddles and other production and living appliances, but also draw a natural boundary for nomads to migrate to and fro north and south between winter and spring, summer and autumn, effectively preventing the cold current of Siberia and providing a sunny and leeward activity space for nomads. In the south, it is adjacent to agricultural areas, which facilitates the trade of food and daily necessities that cannot be produced in nomadic areas.

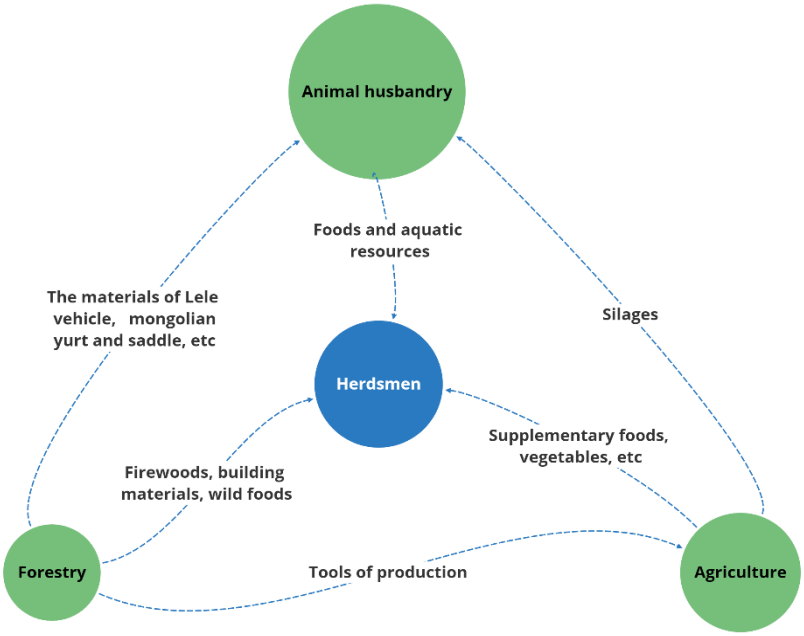

Fig2.2.1 Structure diagram of material products of the Ar Horqin Grassland nomadic system

First of all, the Ar Horqin Grassland nomadic system can meet herdsmen's needs of normal life. The animal husbandry with the vast grasslands as the core provides the herdsmen with such food as milk and meat and fur products; the crop farming, with the farmland near the settlements as the core, provides the herdsmen with such supplementary food as vegetables; the forestry, with the forests in the transition areas as the core, provides the herdsmen with firewood, wild food, etc.

Secondly, the Ar Horqin Grassland nomadic system can also meet herdsmen's needs of nomadic life. Big livestock in animal husbandry can provide the necessary transport capacity for nomadic transfer activities; crop farming provides silage and wintering grounds for livestock; and the wood provided by the forest is essential for making such nomadic tools as Lele carts, yurts and saddles.

Finally, the Ar Horqin Grassland nomadic system also provides a material basis for maintaining Mongolian traditional lifestyle and culture. White food represented by fresh milk, milk silk-skin, milk curd, etc and red food represented by roast whole lamb and boiled mutton constitute the main Mongolian diet structure, which has remained unchanged for thousands of years. Meanwhile, Mongolian traditional culture, including economic activities, lifestyle, customs, etiquette, literature and art, entertainment activities are also inseparable from white food and red food. Meanwhile,

the property rights of pastures for herders are collectively owned by the village[1], and herders can conduct grazing activities on collectively-owned pastures. At the same time, herders have long established relatively fixed grazing points to avoid possible conflicts in pasture use during grazing.

1) Animal husbandry products

The Ar Horqin Grassland nomadic system is mainly based on animal husbandry, and its production mode is mainly based on traditional nomadism. It provides a large number of meat, dairy products and wool products for local herdsmen, and the livestock mainly include cattle, sheep, goats, horses and pigs. In the heritage site, the average household livestock stock is 104, including average cattle raised by per household 13, and average sheep raised by per household 91. Structurally, cattle, sheep and goats are the dominant species, pigs as a supplement species.

Tab 2.1.1 Composition of livestock breeds in the heritage site from 2016 to 2018 (Unit: head)

Year	The number at the end of June			The number at the end of December		
	Sheep	Cattle	Pig	Sheep	Cattle	Pig
2016	654,806	102,373	263	187,915	58,536	413
2017	461,427	105,316	201	258,821	56,096	432
2018	505,222	70,182	371	247,129	55,625	314

The types of animal products in the heritage site are diverse and of high quality. On the one hand, the grassland types in heritage site are rich, such as natural forests, meadow steppe grasslands, dry steppe grasslands, and grasslands with sandy vegetation. Superior natural conditions provide abundant forage grass resources for cattle, sheep and other livestock. On the other hand, farmers adopt the traditional

[1] The grassland is collectively owned by the village and each herdsman household is a contractor and operator of the land, who holds the right to contract, operate and use the land. The local government entitled an area of the grassland to individuals but did not specify which land plots. Under such policy, the grasslands in summer camps are evenly distributed to individuals based on villages. Herders without cattle or sheep may benefit from renting their pasturelands to those in need.
Although men and women take different responsibilities in grazing, they need to form synergy to ensure that grazing is done in an orderly manner. The income goes to a shared household budget. The *Inheritance Law of the People's Republic of China* issued in 1985 regulated that the family property shall be jointly owned by the husband and wife. If the head of a household dies, his or her spouse or immediate children are entitled to inheritance.

grassland nomadic mode of life to ensure that livestock feed on diverse plants with rich nutrition. In 2018, “Ar Horqin Beef” and “Ar Horqin Mutton” were selected as China Protected Geographical Indication Products.

In addition to meat, dairy products and wool products, herdsmen can get livestock waste as fuel from the nomadic system. On the one hand, livestock waste energy plays an important role in promoting grassland conservation. Cattle dung burned by herdsmen is generally left from the previous year, after washing, air drying and other processes, organic nutrients have infiltrated into the soil with rain and there is no fertilizer loss. On the other hand, since cattle dung fuel must have been retained the year before, fuel supply is correlated with periodic migration, which encourages herdsmen to form traditional and relatively fixed nomadic routes. In general, herdsmen in heritage site tend to use cattle dung, followed by sheep and horse dung.

2) Crop farming products

By the end of 2018, the sown area of grain crops in the heritage site was 47,035.1 mu, with a total grain output of 9,968 tons. The crops with a large planting area were the main feed sources for cattle, sheep and other livestock in winter, including green feed, corns, oats and buckwheat. The planting area of these four crops accounted for 99.47% of the total cultivated area of crops in the heritage site. The remaining crops were planted dispersedly, including wheat, soybeans, mung beans, sunflower seeds, vegetables, fungi and herbage. The planting area is relatively large for wheat and mung beans, which are important supplementary food for farmer households in the heritage site.

Tab2.2.2 Area and yield of main crops planted in the heritage site in 2018

	Wheat	Corn	Oat	Buckwheat	Soybean	Mung bean	Sunflower seed	Vegetables and fungi	Green feed	Pasture
Area/ha	152	35,790	1,500	657	50	142	105.2	95	73,682.75	50
Output/t	16	8,923	242	68	6	21	15.8	241	55,263	12.5

3) Forestry products

The heritage site have rich forest resources, and the forest vegetation types are relatively complex. Besides zonal vegetation, the vertical distribution of vegetation is also significant, which provides abundant forest raw materials for the production and life of local residents.

Traditional Mongolian dwellings -- yurts are constructed from materials derived from this nomadic system, along with Lele carts, saddles and a range of production tools; secondly, there are various kinds of edible fungi growing under the woods, which provide abundant food materials and nutrition for the residents of the heritage site; thirdly, the forest ecosystem also provides firewood and other raw materials for their daily life, such as herbs, ingredients.

(2) Important livelihood guarantee

Dominated by animal husbandry, the Ar Horqin Grassland nomadic system, with crop farming and forestry co-existing, provides important livelihood guarantee for local herdsmen. The natural asset, physical asset, human asset, social asset, financial asset, cultural asset of local herdsmen have been maintained at a relatively high level in a relatively long period of time, which indicates that the Ar Horqin Grassland nomadic system has outstanding livelihood guarantee capacity.

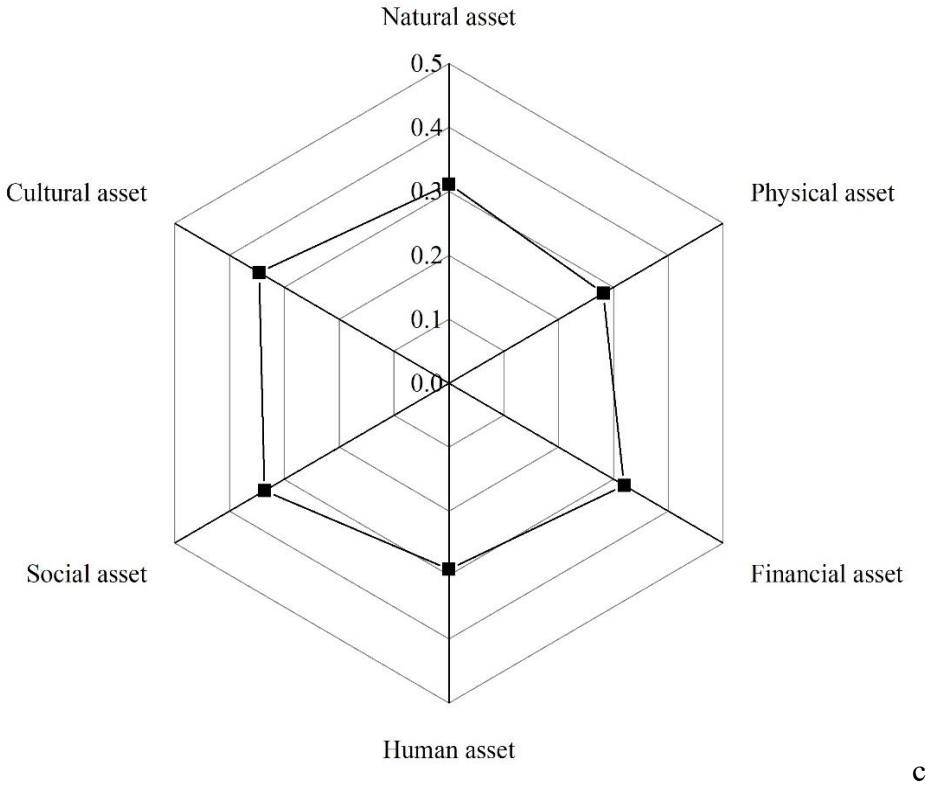

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Fig2.2.2 Livelihood capital of herdsmen in the heritage site

Based on the accounting framework of livelihood capital of farmer households in the agricultural cultural heritage site (Yang Lun et al., 2018), the livelihood capital of

herdsmen in the nomadic system of Ar Horqin Grassland was calculated and evaluated. In general, the average livelihood capital level of farmer households in the heritage site is relatively high, especially those with abundant livelihood capital evaluation value of 1.89. In the six categories of livelihood capital, the ranking of livelihood capital value from high to low is as follows: cultural asset, social asset, financial asset, natural asset, human asset and physical asset, and the evaluation values are respectively: 0.35, 0.34, 0.32, 0.31, 0.29 and 0.28.

1) Natural asset

Natural asset is used to represent the natural resources and environmental services available to farmers. On the whole, the herdsman households have a high evaluation on the natural conditions of the grasslands in the heritage site, and believe that the Ar Horqin Grassland nomadic system provides them with high-quality and diverse forage resources and the system has a natural basis for the development of animal husbandry.

2) Physical asset

Physical asset includes the infrastructure and material equipment used by farmer households for production and living. Herdsman households in the heritage site generally have all kinds of modern living and production tools, such as cars, motorcycles, televisions, etc., to ensure the basic living needs in the process of nomadism.

3) Financial asset

Financial asset represents the cash and financial support available to farmers to purchase production and living goods. In the Ar Horqin Grassland nomadic system, big livestock, represented by cattle, are both an important source of food and a special form of savings, which can be directly exchanged for cash when the family faces difficulties or risks. Therefore, compared with ordinary areas, farmer households in the heritage site have abundant financial capital because they raise a large number of big livestock.

4) Human asset

Human asset represents the knowledge, skills and labour capability that farmer households possess to earn a living. The labour force in the heritage site is abundant, and 56.33% of the total population is adult labour force. Among them, 7,690 people are agricultural labour force, covering 90.40% of the total labour force, indicating that farmer households in the heritage site have relatively abundant human capital.

5) Social asset

Social asset represents various social resources available to farmer households in the process of achieving livelihood goals. In the traditional nomadic process, the herdsman households usually form a close cooperative relationship. And the herdsman households belonging to a large family tend to be distributed in the same Gacha (village) or the neighbouring Gacha (village), so that the herdsman households usually have an average of 15 relatives in the Gacha (village) where they live. Therefore, farmer households in the heritage site have relatively abundant social capital.

6) Cultural asset

Cultural asset reflects the traditional national culture and agricultural knowledge which play a prominent role in agricultural cultural heritage. In the long process of production and life, the herdsman households in the heritage site have formed rich and unique national cultural customs, such as the custom of "leaving pasture" and "returning to pasture" in the process of nomadism; food culture represented by milk curd, milk silk-skin, etc; the national art represented by three national intangible cultural heritages, such as the palace music of the Mongol-Yuan period - Mongolian Khan Court Music, the record of the traditional nomadic production and life style - the craftsmanship of Lele carts, and Ariben Sumu wedding ceremony.

(3) Stable source of income

In the context of the rapid development of the current social economy, the Ar Horqin Grassland nomadic system, which has been passed over for hundreds of years, has continued to provide a stable income source for local herdsmen to ensure their stable production and living. From 2013 to 2017, herdsmen's average annual agricultural income was 8,190.26 yuan. Among them, the average annual income of herdsmen obtained through the nomadic system was 6,815.43 yuan, accounting for 83.25% of the total average annual agricultural income of herdsmen.

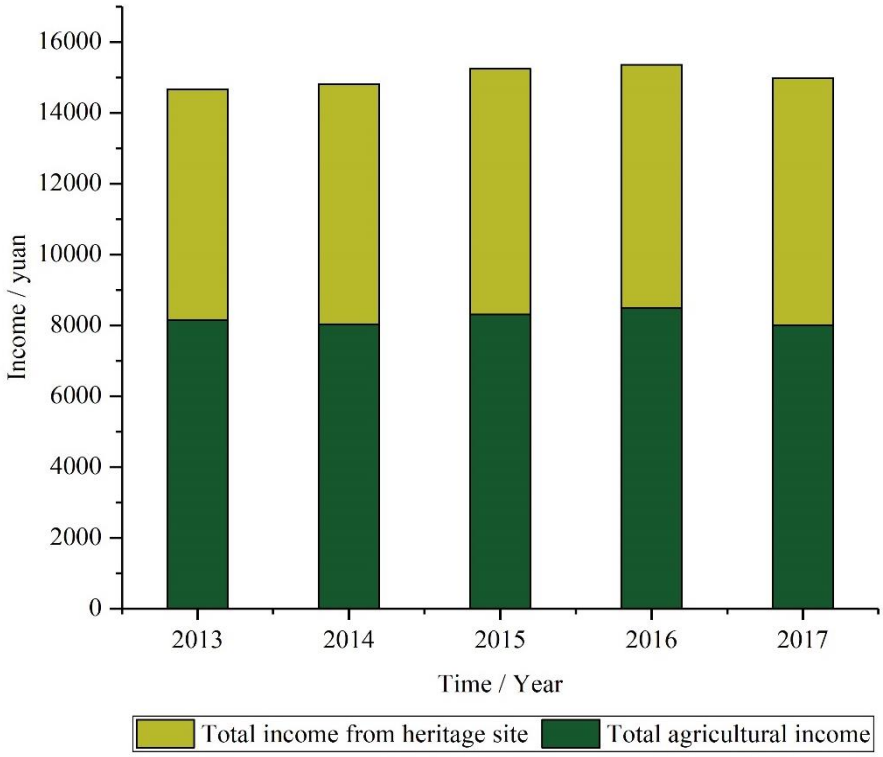


Fig2.2.3 Agricultural income structure of herdsmen in the heritage site

The Ar Horqin Grassland nomadic system not only enables local people to produce and process all kinds of livestock products, but also plays an important role in promoting employment of labour in the heritage site. In 2016, the total labour force in the heritage site was 8,542, accounting for 56.61% of the total population, including 7,894 local people involved in the protection and management of agricultural cultural heritage, accounting for 92.41 percent of the total labour force; in 2017, the total labour force in the heritage site was 8,330, accounting for 55.56 percent of the total population; including Among them, 7,690 local people involved in the protection and management of agricultural cultural heritage, accounting for 92.32 percent of the total labour force; in 2018, the total labour force of heritage site was 8,507, accounting for 56.33 percent of the total population; including 7,690 local people involved in the protection and management of agricultural cultural heritage, accounting for 90.40% of the total labour force.

Tab2.2.3 Changes of labour force in the heritage site Unit: person

	2016	2017	2018
Total number of people	15,089	14,992	15,103
Total number labour force	8,542	8,330	8,507
The number of employees in heritage system	7,894	7,690	7,690

2.2.2 Biodiversity and ecological functions

(1) Agricultural biodiversity

The system is located in the farming-pasturing interlaced area and has rich agricultural biodiversity. According to a survey, the local agricultural biodiversity can be divided into three types by source: domestic animals, plants in courtyards and crops grown in arable land. The livestock raised by farmer households mainly include cattle, sheep, horses, pigs and donkeys (Tab 2.2.4).

The Mongol cattle, Mongol goat, Mongol sheep, Mongol horse and Mongol camel are five major livestock for us Mongolians. Grassland and livestock are the source of life for herdsmen.

Equestrian culture plays an important role in our daily life. The Mongol horses represented the best war steeds in ancient times. Known as the “ethnic minority on the horseback”, the Mongolians herd horses and sheep and live where there is water and grass, thus creating a splendid nomadic culture. Horses are also crucial for the equestrian performances and horseracing of the Nadam Fair and tourist attractions. Like horses, camels can be used for riding, transporting and tourism.

Apart from grazing, transportation and traditional matches, mares and camel cows are mainly used to produce milk that is then made into dairy products.

Tab2.2.4 Diversity of domestic livestock varieties

Species	Traditional varieties	Exotic varieties
Cattle	Mongolia cattle	Simmental, Hereford cattle、Angus、Charolais cattle
Sheep	Mongolia sheep, Han Shan White Cashmere Goat, Zhaowuda Mutton Sheep	Tsigai, Aohan Merino, Small-tailed Han, Boer Goat, Sinkiang merino
Horse	Mongol horse, Ujimqin horse, Baicha Iron Horse, Uxin horse	Sanhe horses, Warm blooded horse, Thoroughbred
Pig	Ulan Hada pig	Landrace, Duroc, Tongliao black pig

Courtyard plants are an important source of food for herdsmen, extremely rich in variety. Of the five popular courtyard vegetable plants, string beans are the most popular. Most families grow beans in their courtyards because this kind of vegetable can be kept for a long time and are to the taste of local people, and the other four courtyard plants are cucumbers, eggplants, tomatoes and spring onions; the five plants with the highest occurrence frequency in the local courtyards are watermelons, apricots, muskmelons, apples and crab apples; the five grain plants with the highest occurrence frequency in the local courtyards are maize, sunflower, millet, soybean and mung bean; the 5 species of ornamental plants with the highest frequency of occurrence are China asters, hollyhock, zinnia, marigold and dahlia.

Tab2.2.5 Frequency of main cultivated plants in courtyard

Name	Frequency	Name	Frequency	Name	Frequency	Name	Frequency
Kidney bean	85.04	Watermelon	33.07	Maize	67.92	China aster	9.45
Cucumber	81.63	Apricot	30.45	Sunflower	22.64	Hollyhock	9.19
Eggplant	72.44	Muskmelon	19.43	Millet	6.92	Zinnia	5.77
Tomato	65.35	Apple	21.78	Soybean	3.77	Marigold	3.41
Scallion	59.58	Bonus	4.69	Mung bean	3.14	Pompon	3.15

Through a long history of farming, the local herdsmen have developed a rich variety of crops. Millet, oats, alfalfa, corns, etc are mainly cultivated in the Ar Horqin Grassland nomadic system. Among them, there are more than 10 kinds of traditional millet varieties, such as Dajinmiao, Xiaojinmiao, Chigusi, Maomaogu, Balixiang, Duganjin, Huangniangu, Maobadouzi, Qibaitou, and so on. Known as the "Grass Capital of China", Ar Horqin Banner has cultivated and planted many kinds of herbage, and oats (13 speices) and alfalfa (28 speices) have been cultivated widely.

Tab2.2.6 Plant species cultivated in arable land

Categories	Sub-Categories	Crop species
grain crops	Cereal crop	millet, buckwheat, oat, millet, naked oat, sorghum, corn
	Peas and beans	Mung beans, red adzuki beans, kidney beans, broad beans, cowpeas
Cash crop	Oil-bearing crop	Peanut, Sesame and Sunflower

Tab2.2.7 Courtyard plant diversity by use

Usage of plants	Species
Vegetables	Onions, garlic, alfalfa, celery, kale, cabbage, turnip, pepper, chrysanthemum, chicory, alfalfa, cucumber, pumpkin, zucchini, carrot, Jerusalem artichoke, sweet potato, lettuce, tomato, kidney bean, radish, eggplant, potato, spinach, hemp Leaf ramie, long kidney bean
Melon and fruit	Peach, apricot, chestnut, European plum, watermelon, seed watermelon, thin melon, cucumber, cantaloupe, melon, oriental strawberry, Chinese sea buckthorn, Ningxia wolfberry, flower red, Malus baccata, apple, hairy syrup, plum, autumn pear, jujube
foodstuff	Buckwheat, sunflower, soybean, hazelnut, red bean, sorghum, wheat, mung bean, corn
ornamental plant	Hollyhock, calendula, aster, canna, cockscomb, dahlia, wood hibiscus, balsam, horse bream, mallow, purple jasmine, evening primrose, round-leaf morning glory, oriental arborvitae, red dragonfly, large flower horse tooth Dragonfly, juniper, marigold, peacock grass, sauerkraut, zinnia
Fiber plant	Castor, wild cannabis, yellow willow, dried willow, big fruit
Firewood plant	Populus simonii, Quercus mongolica, Yellow willow, Salix willow, Big fruit, Family

(2) The diversity of related living things

The plant species in this nomadic system is not very large, but the reserves of various wild plant resources are relatively rich. According to their uses, these plants can be divided into two categories. The first category is plants for traditional utilization, mainly including wild edible fruit plants, wild dietary plants, wild medicinal plants, and wild tea plants; and the second category is used as forage or other wild plants under protection.

The Mongolian people of Ar Horqin Banner have a unique tradition in the recognition and utilization of wild edible plants and medicinal plants, and wild plants occupy a special position in their daily life. There are 15 kinds of wild fruits commonly eaten by them, who collectively refer to the wild fruits as "herrin jimis" (meaning "wild fruit") and distinguish them with different Mongolian names. The plants used for tea is the main way of using wild plants by the local Mongolian people. As the traditional tea plants of Mongolian people, truncatum, atraphaxis manshurica,

potentilla, prunus sibirica and Northeast pyrrosia leaves are special tea plants. There are more than 30 species of medicinal plants and nearly 300 species of herbage plants commonly used by the local Mongolian people.

In addition, there are many kinds of animals in the system, including birds belonging to 14 orders, 37 families and 151 species, wild mammals belonging to 6 orders, 13 families and 30 species, fish 3 belonging to 3 orders, 5 families and 5 categories. Many of them are the national key species under protection (Tab2.2.8).

Tab2.2.8 Wild Edible Plants of Mongolian Nationality in Arukhorqin

Scenaries	Species
Wild fruit plants	Hawthorn, Crataegus sanguinea, Cynanchum chinense, cynanchum thesioides, Malus baccata, Morus mongolica, European Prunus, Padus avium, Siberian apricot, Lobular tea Bracelet, Rosa davurica, Nightshade, siberian elm, *Viburnum mongolicum, Chinese small iris, Fragaria orientalis*
Edible plants	Amaranthus, Portulaca oleracea, Xanthoceras sorbifolia, Chenopodium, Solanum nigrum, Chenopodium acuminatum, Cichorium lettuce, cynanchum thesioides, Periploca sepium, Plantago depressa, Ulmus pumila
Tea plants	Acer truncatum, Polygonum multiflorum, Lespedeza dauricus, Vitex negundo, Broomrape, Paeonia lactiflora, Potentilla, Siberian apricot, Quercus mongolica, Rose, Cephalotaxus, Ulmus pumila, Xanthoceras sorbifolia

Tab2.2.9 Mongolian Folk Medicinal Plants in Arukhorqin

Chinese name	Scientific name	Functions
灯芯草蚤缀	*Arenaria juncea M. Bieb.*	cough
山蒿	*Artemisia brachyloba*	Arthritis, Muscle Pain
冷蒿	*Artemisia frigida*	Skin disease
细叶小檗	*Berberis poiretii*	eye disease
小叶锦鸡儿	*Caragana microphylla Lam.*	Measles
翠雀	*Delphinium grandiflorum*	Dermatosis, insecticide
石竹	*Dianthus chinensis*	hepatopathy
香青兰	*Dracocephalum moldavica*	pinkeye
草麻黄	*Ephedra sinica*	Cold, dermatosis
地锦	*Euphorbia humifusa*	Urinary retention
达乌里龙胆	*Gentiana dahurica Fisch.*	Cold
秦艽	*Gentiana macrophylla*	Cold
甘草	*Glycyrrhiza uralensis*	Cold,cough
天仙子	*Hyoscyamus niger*	toothache
角蒿	*Incarvillea sinensis*	Scabies
马蔺	*Iris lactea var. chinensis*	nterobiasis
细叶益母草	*Leonurus sibiricus*	eczema
芍药	*Paeonia lactiflora*	Hematopathy
野罂粟	*Papaver nudicaule L.*	Colic
梅花草	*Parnassia palustris*	Antipyretic, sore throat
车前	*Plantago asiatica*	diarrhea
平车前	*Plantago depressa*	diarrhea

Chinese name	Scientific name	Functions
扁蕾	*Gentianopsis barbata*	Edema
西伯利亚杏	*Armeniaca sibirica (L.) Lam.*	Measles
华北石韦	*Pyrrosia davidii*	Migraine
黄柳	*Salix gordejevii*	Tinea
宽叶接骨木	*ambucus williamsii Hance*	Cold
尖叶卷柏	*Selaginella tamariscina var. ulanchotensis*	Cramp
苦参	*Sophora flavescens*	Antipyretic
苦马豆	*Sphaerophysa salsula*	Edema

(3) Important ecological functions

1) Water and soil conservation function of the nomadic system

Bayanwenduer Sumu nomadic system consists of hillside forests and thickets in the southern branch of Greater Khingan Mountains, curved rivers, vast and fertile grasslands and nomadic people. Forests and thickets on hillsides can conserve water (Figure 1) and has such functions as preventing wind and fixing sand, preserving soil and water, improving local microclimate, providing habitats for living things, and purifying air. Forests and thickets can effectively reduce soil loss and retain soil moisture by intercepting rainfall and increasing underground runoff. The forests and thickets on the slopes play an irreplaceable role in maintaining the health and stability of the nomadic system.

Rain brought by the river can nourish grasslands, promote nutrient cycling, maintain biodiversity, and guarantee the water for life of the herdsmen (Fig2.2.3). River water is the material basis for the survival of living things on the grasslands and plays an important role in maintaining the sustainable development of grassland ecological environment. Grassland vegetation mainly includes alkali grass, Chinese wild rye, with sweet licorice, radices sileris, chinese thorowax, scutellaria, allium ramosum and other Chinese herbs as a supplement; and natural rivers, mineral springs and lakes not only provide a good living environment for local people, but also play a role in flood storage and drought prevention and improving the biodiversity of the system, which plays an important role in protecting China's gene bank of important biological resources.

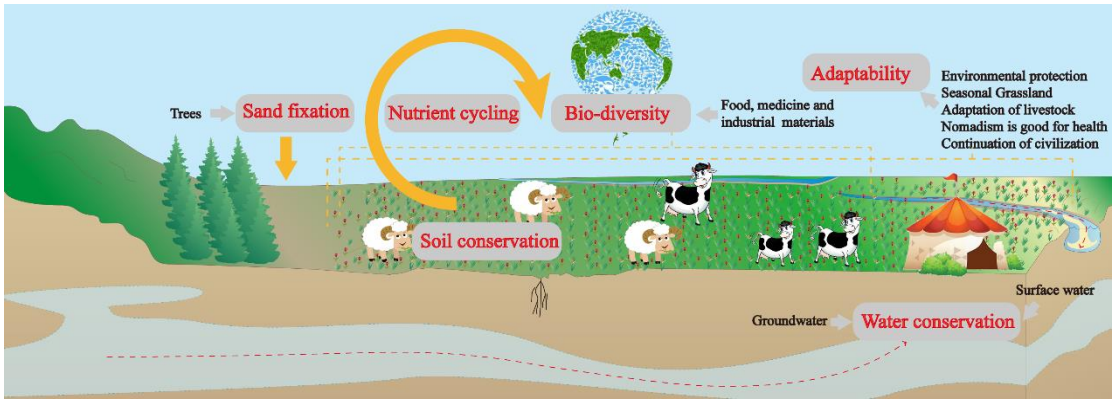


Fig2.2.3 Bayanwenduer Sumu nomadic system

2) Sustainable production function of the nomadic system

In order to adapt to the fragile grassland ecological environment and protect the vegetation in the heritage site, herdsmen adopt a typical nomadic lifestyle. Nomads make use of water grass resources by riding horses to graze their animals, which can protect vegetation and make rational use of water resources while keeping soil fertility from degrading. Compared with settled grazing, aboveground biomass, underground biomass, soil organic carbon, total nitrogen and total phosphorus in the nomadic mode have been significantly increased by 15.25%, 11.18%, 8.03%, 17.69% and 4.39%, respectively (Fig2.2.4). This creative and unique eco-friendly nomadic system provides local herdsmen with stable livestock products and a variety of food. Meanwhile, the traditional nomadic culture with folk culture and food culture as the core has been passed down from generation to generation with the nomadic people as the carrier, making the Bayanwenduer Sumu nomadic system a typical representative of the nomadic culture in north China. The Bayanwenduer Sumu nomadic system is a model of sustainable animal husbandry and ecological animal husbandry.

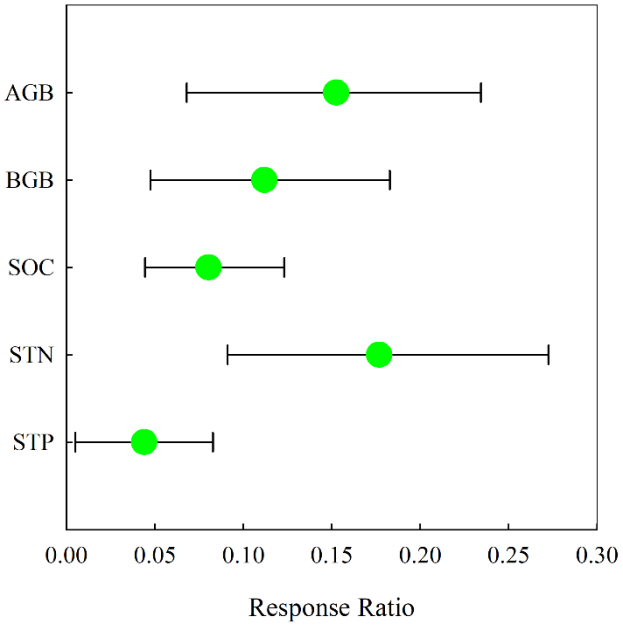


Fig2.2.4 Response ratio of vegetation productivity and soil nutrients to settled grazing and nomadism (above ground biomass (AGB), below ground biomass (BGB), soil organic carbon (SOC), soil total nitrogen (STN), soil total phosphorus (STP))

Note: research methods, by searching related journal articles published from January 1980 and October 2018 (Gao & Han,2011; Gao et al.,2010; Liu et al.,2012; Na et al.,2014; Qiu et al., 2016;Ting et al., 2011; Xue et al.,2016; Yao et al. 2016; Zhao, 1999; Zhao et al., 2011; Zhao et al., 2010) and searching databases of Web of Science and CNKI. The search keywords are: grazing and (soil nutrients or soil properties or biomass) and (grassland or prairie or meadow) and Inner Mongolia. To eliminate bias in the selection of publications, the following five criteria were used in the selection of literature: (1) experiments on grasslands with at least one research group (nomadic treatment); (2) comparison between nomad land and grazing land; (3) in order to eliminate the short-term effects, experiments whose cycle does not exceed one growing period were excluded. (4) the original climatic conditions and soil parameters of the non-grazing land and the grazing land are basically the same; (5) standard deviation (SD), sample size (n) and mean value of data (control and processing) of each variable can be obtained through digitalized tables or graphs. All the graphic data were collected by the software GetData Graph digiizer version 2.2.5. Finally, a total of 16 research points were included for meta analysis in the MetaWin 2.1 software package, and response ratio (RR) of the response variable was calculated. By calculating the response ratio of each group after natural logarithm conversion, the responses of soil properties and vegetation biomass to nomadism were studied.

2.2.3 Traditional knowledge and technology system

Traditional nomadic knowledge is a unique indigenous knowledge system based on the grassland ecosystem and adapted to the social-ecological system. In the interaction between Mongolian herdsmen and grassland and livestock, a set of traditional nomadic knowledge system was formed to manage the grasslands, graze livestock and regulate the relationship between "human-grassland-livestock".

This system of traditional knowledge is accumulated by herdsmen based on long-term experience of grassland environment observation and nomadic practice. The seasonal nomadism based on this traditional knowledge system is the key for herdsmen to adapt to the "fragile", "changeable" and "uncertain" grassland environment. Meanwhile, the traditional knowledge plays an important role in maintaining the sustainability of the grassland ecosystem.

(1) Seasonal grassland transfers

1) Division of pastures

The division of pastures is the basic method to effectively utilize grassland resources in Mongolian nomadic production. Grassland resource is an indispensable means of production in animal husbandry. Climatic conditions and seasonal changes have a decisive impact on its growth. Therefore, Mongolian people generally divide the pastures and make use of grassland resources according to the climatic conditions and seasons. In addition to the decisive role of seasonal changes in the division of pastures, other natural factors such as elevation, topography, distance from water sources, distance from settlements, and the main plant species of grasslands also have a significant influence. In addition, the herdsmen also divide parts of the winter and spring pastures for cutting, harvest and storing the winter forage to ensure the supply of forage for the livestock in winter.

Tab2.2.10 Division of grassland types in the heritage site and its basis of division

Grassland types	**Basis of division**						
	Grazing time	Rest grazing times	Elevation	Terrain	Distance from water sources	Distance from settlements	Plant species
Winter and spring grassland	Winter and spring (Nov.-May)	Summer and autumn (Jun. – Oct.)	Lower	Sheltered valleys and lowlands	Far	Near	Grassland mainly with allium polyrhizum, allium ramosum and sagebrush
Summer and autumn grassland	Summer and autumn (Jun. – Oct.)	Winter and spring (Nov.-May)	Higher	Ventilated slopes, tablelands	Near	Far	Grassland mainly with perennial tufted grass

The division of grassland resources is based on herdsmen's knowledge and management practices of plant-animal-environment, which are integrated into the classification and management of grassland resources in order to provide the most appropriate combination of nutrients for livestock to adapt to the changeable natural environment.

2) Grassland transfer

Grassland transfer is the most important way of nomadism for herdsmen in the heritage site. "Grassland transfer" refers to the orderly transfer of livestock between grasslands in different regions according to the growth cycle of herbage and the changes of climate, which is a process of rotational grazing according to seasons. Herdsmen in the heritage site divided the pastures into two camps: winter and spring, summer and autumn. In early June every year, herdsmen in the heritage site follow three fixed traditional nomadic routes, driving their livestock and daily necessities from the winter and spring camps to the summer and autumn camps around the Greater Khingan Mountains for grazing and related production and life, and then return to the winter and spring pastures from the summer and autumn pastures in late autumn. This transfer from winter and spring pastures to summer and autumn pastures or from summer and autumn pastures to winter and spring pastures is called "grassland transfer". During the transfers, according to the physical strength of the animals and the weather conditions, a certain formation and speed should be kept so as to ensure that the livestock can eat enough and fresh grass during the transfers as much as possible.

Grassland transfer is the production activity of Mongolian nomads choosing grazing sites with different terrains, vegetation and climates in different seasons, and its core lies in "mobility", the seasonal movement of herds between different pastures, which plays an important role in relieving grassland pressure, maintaining the self-renewal and recovery capacity of grasslands and promoting sustainable utilization of grasslands.

(2) Knowledge of livestock management

1) Herd grouping

Herd grouping management is a livestock management method created by Mongolian herdsmen based on the clustering characteristics of livestock in the long-term grazing process. The Mongolian herdsmen in the heritage site have many methods to group their livestock, but they usually do it according to the species of livestock. For example, herds of male sheep and goats, herds of female sheep, herds of bulls, and herds of female cattle; herds of horses, cattle, sheep, etc. In grouping management, the allocation of herd structure is the most important step, and herds of horses, cattle and sheep have their own characteristics in terms of number, female and male proportion and so on.

Herds of horses: herds of horses are mainly composed of male horses for the configuration of herd structure. In general, an excellent stallion is selected from a herd as the leader of the herd. In addition, a certain number of mares, gelding (castrated male horses) and foals are allocated, and the number of horses in the herd is generally maintained at 10-20.

Herds of cattle: the size of a herd of cattle depends on the amount of pasture resources.. In terms of quantity, the number of cattle is generally controlled at 50-60, but it can be adjusted according to the actual situation. In the gender configuration, the cows account for 70-80% of the total herd, and bulls, bullocks (castrated bulls) and calves account for about 20%-30%. In a herd, a bull mating 15-20 cows.

Herds of sheep and goats: the structure and number of a herd of sheep and goats are determined according to the distribution of pasture resources. In flat grasslands, individual flocks can reach up to a thousand or so, while in the areas with smaller pastures, more than a hundred sheep and goats graze in groups. Since sheep and goats are small animals, they are usually herded in groups. Goats are sensitive and active, so they often play the role of bellwether in the herds. When the sheep and goats are in danger, goats can quickly detect the danger, which can prevent the danger and protect the herds of sheep and goats.

Herd grouping management is the most basic management method in the production process of animal husbandry and an effective way to improve the economic benefits of animal husbandry. Herdsmen in heritage site use the breeding

characteristics and living habits of livestock as the principle of deploying the structure of the herds, through optimization of the structure of herds, reasonable control of the scale of herds, and it not only can adjust the relationship between herds and pastures and improve the utilization rate of pastures, but also bring great convenience to grazing management and promote the sustainable development of people, livestock and grasslands.

2) Livestock grazing

According to seasons, environmental conditions, and species, habits, physical strength and other factors of the livestock, the Mongolian herdsmen in the heritage site graze and manage their herds by controlling grazing time and mode. The grazing methods can be divided into group grazing and divisional rotational grazing.

Grazing time: the general principle is "going out early and coming back late", that is, going out as early as possible and returning as late as possible to maximize the herd feeding time. In the hot summer, the sheep and goats tend to gather together. Early departure and late return can prevent the occurrence of heat stroke of sheep and goats. In autumn and winter, grazing time can be a little later, and grazing in the low-lying wet areas should be avoided so as to prevent the infection of parasites. After the autumn equinox, make full use of the scattered grain, fallen leaves, weed seeds for grazing, and at the same time do not let pregnant ewes eat grass with frost and snow to prevent miscarriage, and feed then with more fine feed and warm water with salt.

Grouping grazing: it is a method for herdsmen to herd their livestock according to their species and constitution. The way of grouping varies according to different grazing needs. (1) For the purpose of protecting grasslands and making full use of resources, the key point of grouping grazing is to arrange the grazing sequence of different livestock groups. Herdsmen arrange the grazing sequence according to the grazing characteristics of livestock. For example, in a meadow, the sheep and goats and horses that cause the least damage to the grassland resources are firstly grazed, then the cattle are grazed, and finally the goats are grazed. Because the cattle trample badly on the grass and the goats like to eat the grass roots, which damages the grass and is not conducive to the growth of grass, so they are put in the last place in the arrangement of grazing sequence. (2) Grouping grazing according to the herd

constitution, for example, robust sheep and goats can be grazed in the pasture with a steep slope far away from the grazing site, and pregnant ewes and emaciated sheep and goats can be grazed near grazing sites with gentle slope and good pasture.

Divisional rotation grazing: rotation grazing adopts the principle of "first high, then low, first steep, then flat, first far, then near". When grazing in autumn, graze in the pastures far away from the grazing sites; especially when arriving in the winter pasture, graze from far and then to near sites, because the sheep and goats in the pastures far away have fewer sheep, more grass seeds and enough grass. In addition, due to the cold weather in winter, snow and wind gradually become more, so grazing in early winter should be on high grasslands, and then in low grasslands in deep winter in order to avoid wind and coldness. In spring, due to the poor physical condition of the sheep and goats, grazing should be at near, low and flat sites, and the nearest pastures should be reserved for ewes that are about to give birth to lambs or have just given birth to lambs. In summer, because the sheep and goats eat well and their physical strength gets enhanced, they can graze on the steep slopes first and then on the flat sites to make the best use of pasture resources.

3) Breeding of breeding stock

Breeding of breeding stock is one of the livestock management methods for herdsmen in the heritage site to improve the quality of livestock groups and the survival rate of breeding. Herdsmen's breeding of breeding stock are mainly judged according to the following four standards:

(1) Investigate and learn about the pedigree, physique, physical strength and product quality of the parents of candidate breeding animals to ensure that the candidates meet the standard in this respect;

(2) Carefully check the shape, hair colour and physique of alternative breeding animals, and ensure their characteristics and standard requirements;

(3) Re-examine the selected breeding animals after half a year or a year, and leave qualified breeding animals according to the growth and changes. The retained stock is used for breeding, and the final conclusion is made according to whether the newborn animals are good or meet the standard requirements.

For example, the selection of stallions should start from the foals and select when the foals are about 4 years old. The stallions should be selected according to the

following aspects: (1) pedigree: they must be selected from the foals produced by the mature mare; (2) appearance: strong body, thick neck, neat four hooves, complete external genitalia; (3) habits: gentle, good sense of herd protection, strong sexual desire; (4) hair color: the hair color of stallions should be black, brown or purplish red.

a. Observation of foals

b. Long coccyx

c. Wide forehead

d. Wide crotch

e. Neat hoofs

f. Mild habits.

Fig2.2.5 Stallion Selection

4) Herd control

Herd control refers to a livestock management method in which the herdsmen in the heritage site, taking advantage of the opportunity of slaughter in autumn to deal with the old, weak, sick, disabled and young animals in the herd by means of selling and slaughter so as to control the number of the herd and improve the quality of the herd. The key point of herd control lies in the time, quality and structure of livestock for slaughter. The time of slaughter is generally concentrated in the autumn, namely the early period transfer from the summer pasture to the autumn pasture; the control of the amount of livestock for slaughter is determined according to the number and species of livestock, and different livestock has different the proportion of livestock for slaughter. In addition, it is also necessary to control the ratio of male to female of livestock, mainly selling the old, weak, sick, and disabled animals, including: sick and disabled livestock, female animals that do not give birth for several successive years, female animals that habitually abandon their young, have low milk production, cannot feed their young up, and unqualified breeding stock, etc.

In essence, herd control is an artificial selection of livestock groups by herdsmen. In this way, excellent livestock varieties and resources can be retained and inferior ones can be eliminated to ensure the overall quality of livestock groups. And it improves the ability of the whole herd to cope with the disastrous weather in winter, and strengthens the adaptability of livestock to the risk of climate disasters.

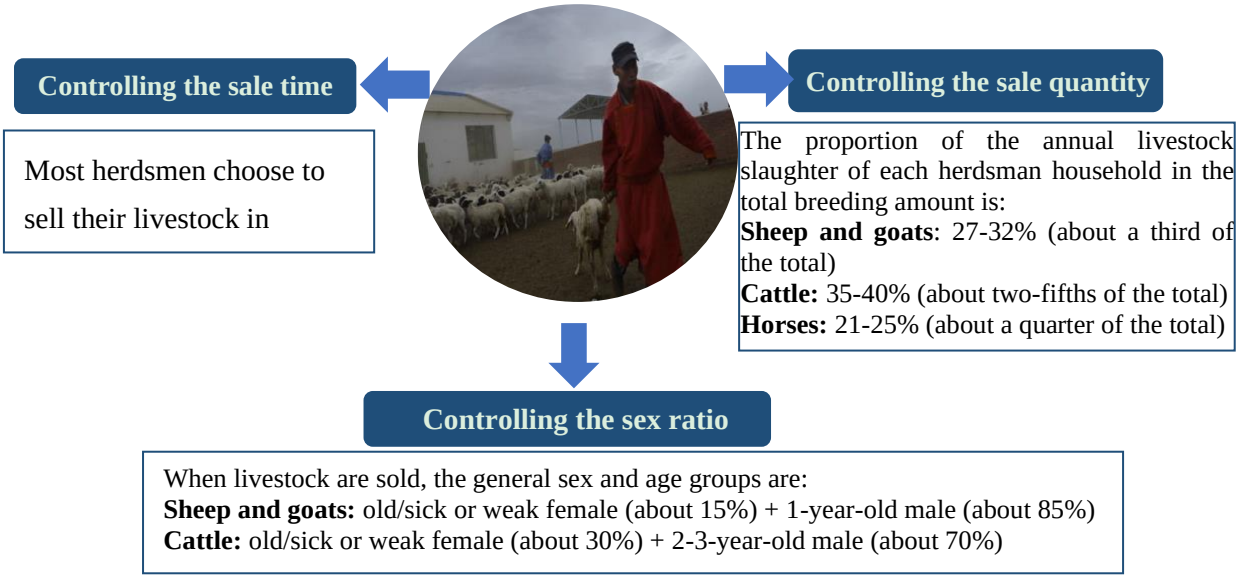


Fig2.2.6 Livestock adjustments during livestock sales

（3）Epidemic prevention and treatment

The prevention and treatment of livestock diseases is an important part of livestock breeding, which is of great significance to maintain the stability of livestock production scale and reduce the risk of diseases. In heritage sites, nomadic not only a way of production and life, but also an effective means to reduce the occurrence and spread of livestock diseases. At present, The role of traditional knowledge mainly lies in prevention and adjuvant treatment of livestock diseases. At present, the role of traditional knowledge is to prevent and assist the treatment of livestock diseases. When some livestock diseases such as Sheep Pox, Anthrax and other diseases occur, herdsmen mainly rely on modern medical means for treatment.

1) Traditional Prevention of livestock diseases

Livestock self-breeding: The herdsmen in the heritage area adhere to the principle of self-breeding in livestock breeding, and attach great importance to the selection and conservation of their own livestock, and rarely introduce foreign varieties, which is of great significance for the prevention and control of local livestock diseases

Clean the colony house regularly in spring and winter: In spring and winter, livestock are mainly domesticated in winter and spring pastures, with a small range of activities. Therefore, the herdsmen in the heritage site mainly kill the parasite eggs and some pathogenic microorganisms in the enclosure by regularly and timely cleaning the faeces in the enclosure, disinfecting the enclosure, etc., so as to eliminate the possibility of livestock transmitting the disease through faeces.

Regular transfer in summer and autumn pastures: The prevention and control of livestock diseases by herdsmen is combined with their seasonal nomadic ways. Mainly through the way of regular transfer, it can effectively prevent livestock excrement from polluting the grasslands, especially repeated infection caused by parasitic worm eggs from livestock, and can effectively prevent and control livestock parasitic diseases; meanwhile, through the rational movement during the nomadic process, the physique of livestock can be enhanced to ensure the health of livestock.

2) Traditional treatment of non-infectious and conventional diseases of livestock diseases

Bloodletting therapy: For the treatment of common diseases, herdsmen mostly take local materials, and the treatment method is simple and effective. The common one is bloodletting therapy, that is, the traditional therapy that the shepherds use the needles they take with them to carry out acupoint stimulation and bloodletting to treat the common diseases. This method has the advantages of simplicity, convenience, low cost and quick effect.

a. Apparatus used in bloodletting

b. Acupuncture at special points

c. Acupuncture at special points

d. Acupuncture at special points

Fig2.2.8 Acupuncture for bloodletting treatment of horse diseases

Other traditional treatments:

- **Poisonous grass poisoning**: drenching yogurt to livestock that mistakenly eat poisonous grass.
- **Indigestion of ruminant livestoc**k: such as cattle and sheep and goats, it is generally used to inoculate healthy cattle and sheep with ruminant pellets, which is consistent with modern medical theory.
- **Digestive tract diseases**: feeding sick livestock with mare's milk to treat

livestock poisoning, gastrointestinal and cardiovascular diseases.

3) Regular use of drugs for insect repellent in spring and Autumn

It is one of the main methods to control livestock disease by using medicine to drive away tapeworm and nematode in sheep intestine. At the heritage site, Herdsmen regularly carry out epidemic prevention and pest control twice a year in spring and autumn. In the middle of May every year, the lambing of ewes is basically over, cattle and sheep are fed with anthelmintic to drive away all kinds of parasites in and out of the body, and vaccinated with related vaccines such as goat pox vaccine, dry powder inactivated vaccine for sudden gangrene and enterotoxemia. In the middle of October, another disinfestation and epidemic prevention was carried out. In addition, herdsmen will remove the external parasites artificially.

a. Parasite expelling in the flock of sheep and goats

b. Epidemic prevention in the flock of sheep and goats

Fig2.2.7 Livestock disease prevention

(4) Livestock feeding and breeding technique

1) Livestock breeding technique

Breeding of livestock concerns the overall situation of livestock production. Mongolian herdsmen in the heritage site attach great importance to breeding of all kinds of livestock. They determine the breeding time of all kinds of livestock by measuring livestock's estrus season and the gestation period of female livestock. And the livestock breeding management should be carried out on the basis of the male livestock' weight gain and the proportion of the male and female animals. The

survival rate of the livestock, especially the lambs, can be improved by controlling the breeding time of the livestock, so that the offspring can be born in a suitable season. And it is also matched with the time of nomadic transfer, which is the wisdom of herdsmen in the management of livestock.

Breeding of sheep and goats: in the heritage site, sheep are usually mated in autumn and lambs are born in late winter and early spring. However, since there is no fixed estrus time for male sheep and goats, manual intervention is needed to prevent the loss of fat caused by mis-mating of breeding animals and affect their lambing on a seasonal basis. Herdsmen adopt two main methods of manual intervention: one is the separate management of male and female sheep and goats, grouping grazing; another method is to wrap a piece of cloth around abdomens of male sheep and goats to prevent mating. At the beginning of breeding, the proportion of male and female sheep and goats should be properly matched. In general, there are 30-40 female sheep and goats for one male. In practice, the herdsmen will increase or decrease the number of female animals according to the male animals' physical condition and weight.

Breeding of cattle and horses: generally, regular self-breeding only needs to control the proportion of male and female animals. A bull mating 10-15 cows and a male horse mating 15-20 mares, and the male horse does not mate with close relatives. and has the characteristic of assembling its own mare herd.

2) Livestock castration technique

Castration is a technical activity for Mongolian herdsmen to control the size of livestock in the heritage site. Due to the high annual reproduction rate of livestock, herdsmen in the heritage site will castrate young males in a fixed period of time every year in order to control the rapid increase in the number of livestock and the size of livestock. In the late spring and early summer, when the weather warms up and mosquitoes and flies have not yet reproduced, it is the best time for castration. However, due to the physiological characteristics of different breeds, the specific castration time and means are different.

Castration of male lambs: male lambs are sexually mature early and have sexual impulses in 3-4 months old after birth, so herdsmen usually choose to castrate male lambs when they are 3 months old, that is, at the end of spring. Male herdsmen

can hold a knife and make a small cut on the top of the male lamb' scrotum with the tip of the knife, and then pull out the testicle and pinch incision for a few times with the thumb and index finger. Castration of male lambs is relatively simple and can be performed independently by male herdsmen.

Castration of male horses: castration of male horses is generally carried out when the male horses are 3-4 years old. The season of castration of male horses is generally in late spring, when mosquitoes and flies are still dormant and the climate is suitable, and the horses are just eating grass to restore their strength, neither fat nor thin, so castration at this time can help heal the wound and restore strength after surgery. The castration of the male horses is difficult and requires the cooperation of 3-4 people. The castrated male horse should not be put into the horse herd immediately but isolated from the horse herd, cover felts and other articles on the horse's back to keep warm, avoid strenuous exercise, feed appropriately, and take care of it alone for half a month. If there is no adverse reaction, it can be released into the horse herd.

Castration of bulls: bulls are castrated when they are 2-3 years old in a manner similar to that of male lambs. Cut open the skin of the bull's scrotum, extract the testicle and wrap the wound with sheep wool. Castration is beneficial to the growth and development of calves for making them robust and increasing meat production.

3) Livestock delivery and care techniques

The delivery and care of the young of livestock is a key production activity in the livestock breeding for herdsmen in the heritage site. Due to the different degree of care for the young of different livestock, and taking into account the climate and environmental conditions, targeted delivery and care of the young of livestock is of vital importance for the survival rate of the young of livestock.

Sheep and goats: the lambing season is relatively cold, and ewes may also do not recognize the young lambs, so manual intervention is required. The delivery and care for lambing include pre-lambing preparation measures and post-lambing care measures. Pre-lambing measures: (1) Lambing site disinfection: before lambing, the sundries in the site should be cleaned and the ashes generated by burning sheep dung should be scattered on the site for disinfection; (2) Stock up on animal feed. Post-lambing measures: (1) keep lambs warm: since the spring when the lambs are

born is cold, in order to prevent frostbite of the young lambs, the new-borns should be put into the special felt bags for keeping warm; (2) Auxiliary feeding: when the young lamb is just born, its self-reliance is relatively weak, especially for the female lamb giving birth for the first time, artificial assistance for feeding is needed to enhance the physical strength of the young lambs; (3) Marking: in order to avoid confusion between the lamb and ewe, the lamb and ewe will be marked with the same colour in the same place.

Fig2.2.9 Keep warm for the lamb in a felt bag

Fig2.2.10 Artificial feeding

Horses: Increase the care visits. In general, the horses feed freely in the wild and only need to be cared for once a week. When the mares are in the foaling season, they basically need to be cared for once a day and the old and weak mares have to be driven to home for care.

Cows: prenatal measures: gather cows in a warm and well-watered area and feed freely and calve on their own.

Postpartum measures: the herdsmen drive the herd back home and tie them; the cows feed freely by day, and milk the cows after driving them back.

4) Horse training methods

Mongolian horses have amazing endurance. Besides their unique hereditary genes, Mongolian horses mainly rely on the special training methods. The most important Mongolian horse training method is "Diaoma (Mongolian-style training of horses)", which is a complete set of training methods including the training phases of Hitching, Sweating and Running Training. "Hitching" means to tie a horse to a pole at a certain time of the day and control its diet. "Sweating" means that the horse excretes

a lot of sweat through a certain amount of running so as to adjust the training intensity according to the characteristics of the sweat. "Running training" refers to the training of horses to run first near and then far, so that the horse gradually adapts to the high-intensity exercise. "Diaoma (Mongolian-style training of horses)" plays an important role in improving the quality and endurance of Mongolian horses, and the Mongolian nomadism and hunting on the grasslands all rely on the horses' super endurance.

Tab2.2.11 The Steps of Mongolian Traditional Horse Training

Date	Training contents	Date	Training contents
1st Day	Warm-up running	14th Day	Take a rest
2nd Day	Short-distance running	15th Day	Running training
3rd Day	Perspiration	16th Day	Low-speed running
4th Day	Short-distance walking	17th Day	Running training
5th Day	Low-speed running	18th Day	Burning incense
6th Day	Running training	19th Day	Long-distance running
7th Day	Take a rest	20th Day	Low-speed Running
8th Day	Perspiration	21th Day	Low-speed
9th Day	Low-speed running	22th Day	Short-distance running
10th Day	Low-speed running	23th Day	Take a rest
11th Day	Running training	24th Day	Low-speed Running
12th Day	Perspiration	25th Day	Horse racing
13th Day	Low-speed running		

(5) Yurt construction technique

Yurts are the traditional dwellings of Mongolian and other nomadic peoples in northern China. According to *The Secret History of Mongolia*, yurts have been built and used for more than one thousand years. The yurt is round and drum-shaped. Its basic structure is composed of the yurt door, Hana (wall), Uni (rafter) and circular skylight, which are the four main components of the yurt. In addition to the main components, yurts also have felt wall, decorative cloth, pendant ropes and so on. Yurts are made of bar wood, leather ropes and wool ropes.

Yurts are the outstanding cultural heritage of nomads combining ecological wisdom and nomadic production mode. The structure of the yurt fully adapts to the special natural environment and nomadic needs of the Mongolian plateau. First of all, the site selection of the yurt is related to livestock management. Generally, it is

selected to be ventilated and close to water and grass for the convenience of grazing cattle and sheep and goats and collecting water for living. Secondly, the special structure of the yurt makes it warm in winter and cool in summer with good lighting. Moreover, its unique round and drum-shaped shape can effectively reduce the impact of snowstorms and cold climate, and it has good ecological adaptability to the Mongolian plateau environment where it is located. Thirdly, the building materials of yurts are generally processed products of livestock such as ropes, felt and wood. Most of the raw materials come from the nomadic system and are locally sourced. Fourthly, yurts are easy to install, disassemble and carry, suitable for Mongolian nomadic lifestyle.

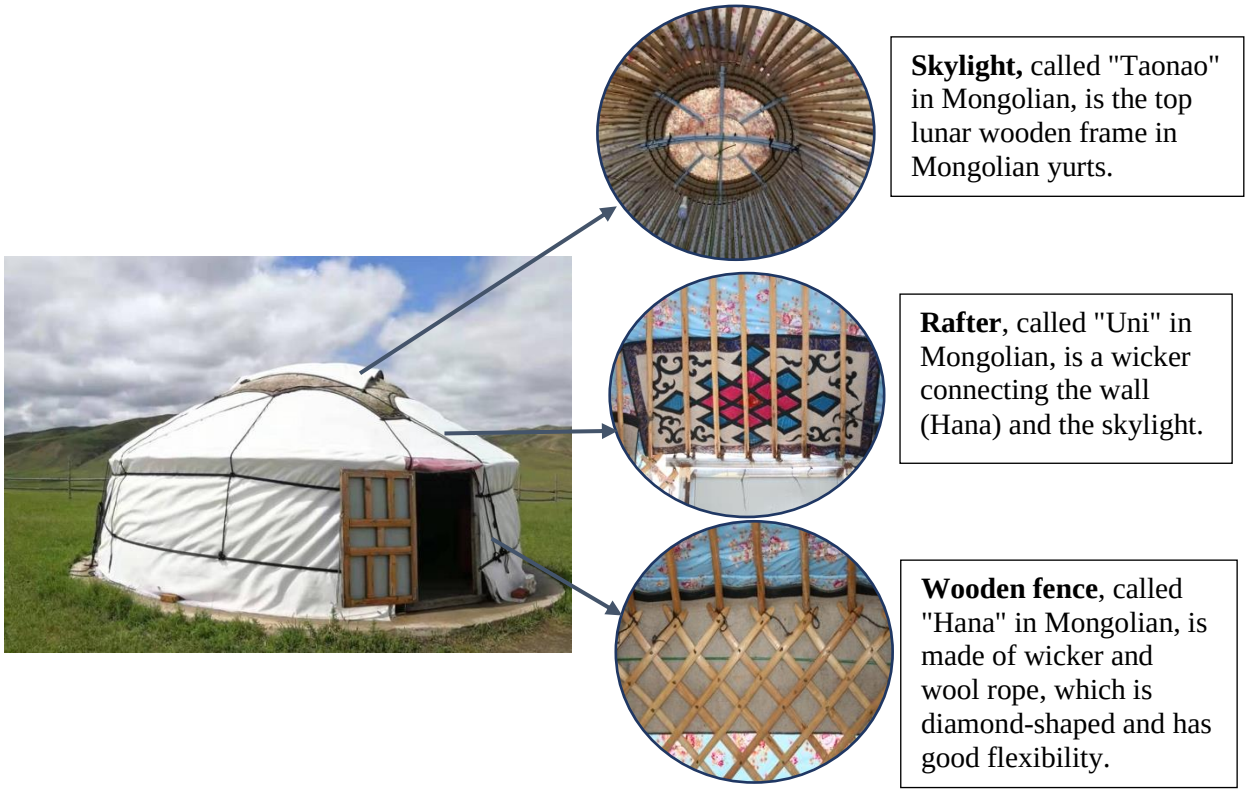


Fig2.2.11 Structure of Mongolian Yurts

(6) Nomadic apparatus making technique

1) The making technique of Lele carts

Lele carts are a commonly used traditional means of transportation in the Mongolian plateau areas. The traditional Lele carts are characterized by simple

structure, easy access to materials, light weight and applicability, etc, so it is called "boat on the grassland" and plays a unique role in the traditional nomadic life.

The model of the Lele cart is mainly characterized by large round wheels. The Lele cart has simple structure, mainly composed of the frame, wheels and the axle. Material selection is important for making wheels, and local materials are more used, with the birch, oak, and elm on the steppe mountainous area, because of different areas and structural components, willow and pine can also be used. The selected materials should also be salted for three years to enhance their toughness and durability. Lele carts are mainly used for the transporting herdsmen's living and household items in the process of transfer. According to its different uses, the carts can be divided into two categories: for riding and for carrying goods, and the carts for riding are called covered wagons, covered with felt, and the carts for carrying goods include the carts for carrying tents and goods.

a. Lele cart – covered wagon

b. Lele cart - water cart

c. Lele cart for carrying goods

d. Lele cart for carrying goods

Fig2.1.12 Classification of Lele carts

Mongolian traditional Lele carts are made of local materials from the Mongolian plateau, and many special models are derived according to the needs of nomadic life. This traditional means of transportation is in line with the nomadic life of Mongolia and meets the needs of transportation, storage, residence and migration in the Mongolian nomadic life, and they have become an important demonstration of Mongolian traditional culture.

2) Leather product processing technique

The processing of leather products is the ancient traditional craftsmanship of Mongolia. The craftsmanship is unique and there is a set of exquisite techniques in the use and processing of raw materials, which reflects the Mongolian people's exquisite use of natural materials. For example, the sheepskin from winter slaughter is generally used for clothing, because the winter sheepskin is thick and the wool is long, the sheepskin is more suitable for making warm leather robes. The cowhide or sheepskin from summer slaughter is usually called light leather, animal skin without fur, which is suitable for making leather boots or utensils. The use of leather of different ages is also different, and the use of leather from adult animals is more extensive, mainly for making leather ropes, whips, pants and so on.

The processing process of Mongolian leather products in the heritage site is mainly divided into the following steps:

(1) Shave the fur and cut the leather strips: shave the hair off the skin and cut the skin into strips about 5 cm long;

(2) Leather dressing: make the skin soft and durable through certain processing and special fermentation;

(3) Stretching leather: repeatedly stretching and rubbing the leather to make the strips more soft and elastic;

(4) Smoking sheepskin: smoke the sheepskin surface yellow with smoke from burning horse manure or cow manure. After that, the sheepskin can be mothproof and dirt resistant.

For the Mongolian people who take animal husbandry as the main mode of production, livestock and its accessories are the basis of their food, clothing, shelter and means of travelling. Among them, leather products are the main raw materials for

their clothing, and they are locally sourced, cold-resistant and durable, and adapt to the cold environment and nomadic lifestyle of the Mongolian plateau.

3) Wickerwork

The wickerwork is a traditional handicraft to weave various articles with wicker. Mongolian people use wicker to weave various production and living tools such as yurts, fences, cow-dung baskets and various small baskets to meet the needs of nomadic life. These wicker articles consist of warp and weft strips that form the basic framework. Among them, the warp strips constitute the framework, relatively sparse. The weft strips are closely interlaced with the warp strips to form a complementary whole.

The general making process of wickerwork is as follows:

Make the basket bottom: poke through the middle of the four wicker sticks lengthwise, insert the other four wicker sticks, adjust them neatly, and tie the roots tightly with thin wickers. And then begin to weave with two thin wickers, after several rounds, wicker sticks become radial strips at the bottom of the basket.

Fig2.2.13 Making the basket bottom

Make warp strips of the basket: insert a wicker on each side of a warp strip, and these wickers will become the warp strips of the basket side. Then weave these warp strips with three wickers and lift them up one by one, and then the side of the basket is basically formed.

Fig 2.2.14 Making warp strips of the basket side

Make the weft strips of the basket: inserted wickers between the warp strips, from left to right. When weave to a certain height, cut off the excess parts of the weft strips and use the warp strips to make the rim of the basket.

Fig 2.2.14 Making the rim of the basket

4) Mane rope making technique

Mane rope making technique is a method of making Mongolian traditional ropes. Its raw material - mane is an important by-product of horses. Mongolian people shear horse mane every spring. Horse mane ropes are very strong and durable, and they are an important rope product for tying livestock and building yurts. The making methods of Mongolian mane ropes in heritage site are as follows:

Make mane rolls: spread out the bristle roots into squares or circles in a crisscross pattern, put more in the middle. Spread to a certain thickness, roll into a spindle-shaped mane roll.

Fig 2.2.15 Making mane rolls

Single strand of mane rope: spinning the mane roll into a single strand requires a special homemade machine -- spinning disk. One end of the mane coil is hung on the one end of the spinning disk, and one hand turns the spinning disk, and the thumb and forefinger of the other hand pinch the mane so that it is drawn out evenly. The thickness of the mane rope is determined by its purpose.

Fig 2.2.17 Making single strand of mane rope

Put strands together: put the single strands of mane ropes together.

Fig 2.2.18 Put strands together

(7) Nomadic food processing technology

1) Dairy food processing technology

Mongolian people have a long history of eating milk products, but they seldom drink milk directly in their habits. Except that they boil milk tea with fresh milk, milk should be processed into various dairy products. The processed dairy products are easy to carry and have a long shelf life, so the products are one of the important nutrition sources in herdsmen's life and suitable for herdsmen's nomadic life. Mongolian dairy products have a wide range of products, which include yogurt, butter, cheese, milk curd, quark cheese, etc. The milk products with unique flavour are made delicately and well received by people. In July and August, the grasslands have abundant rainfall and cows produce a lot of milk, so they are the best seasons for making and harvesting milk food. Milk food processing mainly has the following steps:

Milking: women are in charge of milking the cows and sheep once a day in the morning and night, and the cows have the most abundant milk quantity before and after grazing.

Fig2.2.19 The Mongolian woman is milking

Filtering: Use gauze to filter out any wool or other impurities that may have been accidentally mixed during milking or transportation.

Fermentation: add the yeast seed and leave at room temperature for about 12 hours, and after about 12 hours, it ferments into yoghurt.

Cooling and separation: after fermentation, cooling and standing, the milk will be layered. After different processing, the separated milk can be made into wet cheese,

butter, milk curd, quark cheese and other different Mongolian traditional dairy products.

Heating and stirring: heating and stirring is the most important part of the whole process. Depending on the way and strength of stirring, the final products will taste different. After separation, the remaining precipitate should be continuously stirred clockwise, and the length of time depends on the experience of herdsmen.

Extruding, moulding and air dry: put the thick raw milk after stirring into the mould, let it stand still and then put it on a stone plate for artificial extrusion and cutting, and finally for air dry.

Fig2.2.20 Dry dairy products

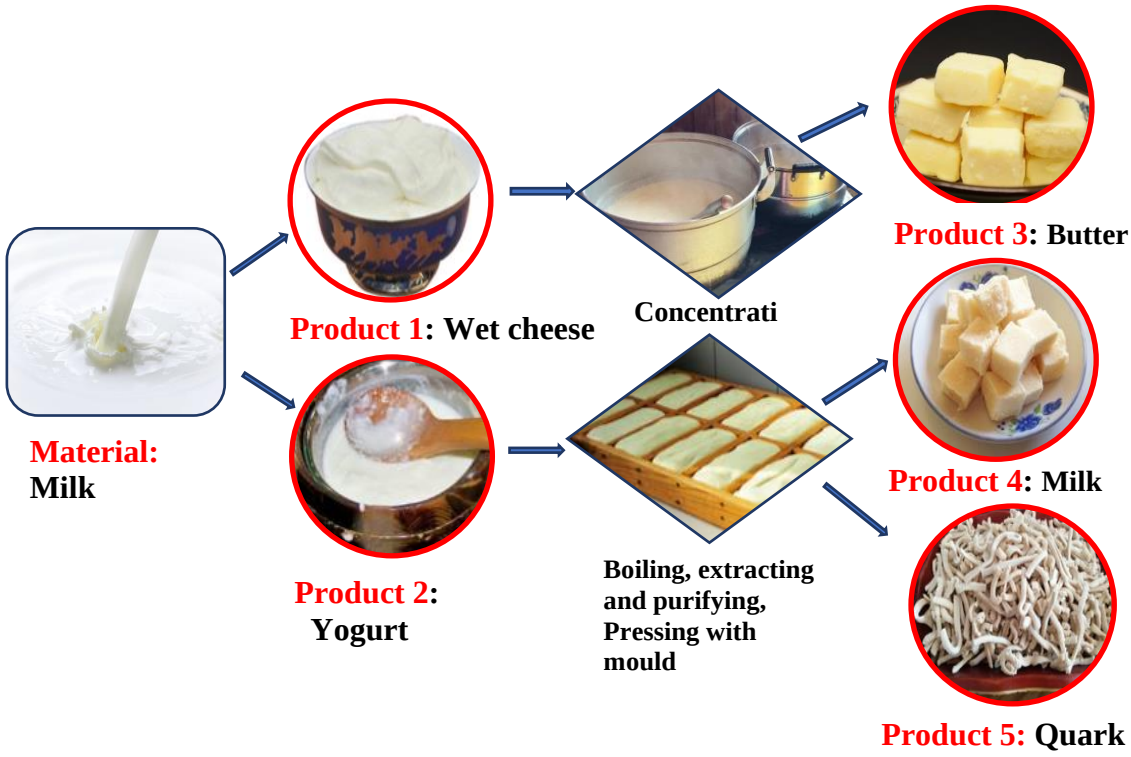


Fig2.2.21 Processing process of dairy products and related products

2) Meat processing technology

Mongolian people in the heritage site take livestock as the main industry and mutton and beef as the staple food and horse meat as a supplement. Due to its fresh and tender taste and rich nutrition, mutton is still the main meat for Mongolian people, followed by beef. In the long nomadic life, herdsmen have created and accumulated lots of meat processing skills, which can be divided into four categories, namely stewed, roasted, air-dried and naturally frozen mutton. Air-drying technique is the most characteristic method of Mongolian meat processing and preservation. The air-dried meat has a long shelf life and is easy to carry and has high energy, and it can be eaten raw, so it is an ideal dry food in Mongolian nomadic life.

Stewing: after peeling the sheep, cut the whole sheep into pieces, boil them in a pot with water until they are almost ripe and then they can be served up.

Roasting: after peeling the sheep, put up a wood fire, put an iron rack over the wood fire, and then hang the whole sheep on the rack to roast and sprinkle some salt until the skin is brown, then it can be served up.

Air drying: get rid of fat and tendon from beef and mutton, cut the lean meat into long strips, marinate them with salt, and dry them in the sun for eating in spring.

Natural freezing: a commonly used method of meat storage in winter, that is, beef and mutton are put into the rumens of cattle or sheep for preservation by natural freezing for eating in winter.

3) Brewing technology of horse milk wine

Koumiss also known as Mongolian wine takes horse milk as the raw material, and uses Tongzhi (a Mongolian special processing method, putting horse milk into a leather bag for shaking), stirring, fermentation and a series of technical means, and it is a special beverage drink. Koumiss needs not to be distilled, so the alcohol degree is low, and after drinking people get excited but not drunk, and it tastes sweet, mellow and strong and has rich nutrition, so it has not only delicious taste but also extremely strong tonic effect to human body, as well as the function of keeping warm, so it is the Mongolian people's favourite drink and also used to entertain guests. The main production process is as follows:

Make fermented horse milk: firstly, milk is used to make horse milk distiller's yeast, and then pour raw horse milk into a leather bag or bottle containing distiller's yeast and hung it in a place warm and sunny.

Fermented horse milk is processed into koumiss: stir the fermented horse milk irregularly with a special wooden stick every day for 7-8 days. When the fermented horse milk becomes colourless and transparent after precipitation and tastes hot and sour, then it becomes koumiss.

2.2.4 Culture, value system and social organizations

(1) National culture

1) Material culture

Traditional food culture

Rich types of traditional food: local people's traditional food can be divided into white food, red food, green food, yellow food and other categories.

White food refers to dairy products, which are made from the natural pure milk of horses, cattle, sheep and camels and rich in variety and nutrition, essential for home catering, receiving guests and honoring the gods. Because fresh milk is not easy to store, local people have processed and created more than 20 kinds of dairy products with high nutritional value and long shelf life, such as yogurt, cheese, ghee and milk wine, which have greatly enriched the food culture of the Chinese nation.

Fig2.2.22 Mongolian traditional white food

Red food refers to meat, the main food to feed the local people. It mainly comes from domestic animals, mainly sheep, followed by cattle. If it is not a big feast, horses are not usually killed (because of the Mongolian traditional concept of loving horses). In order to adapt to the local environmental conditions, people have created such food which are easy to storage and transport as dried meat, strips, slices, meat powder made from roast and smoked beef and mutton and air dried and salt dried beef and mutton, so their shelf life can be extended.

Fig2.2.23 Mongolian traditional red food

Yellow food refers to millet stir-fried in butter through boiling, frying and other processes, and it is easy to carry and store and is one of the traditional food in the heritage site. There are many food combinations for Mongolian people to eat millet stir-fried in butter. Early in the morning, before grazing, the herdsmen would drink hot milk tea and brew a bowl of millet stir-fried in butter for tea. When drinking the milk tea enough, the millet stir-fried in butter is softened, and then they would drink the tea in the bowl and eat it up, and also mixed with butter, milk silk-skin, cheese and brown sugar, moderate sweet and sour, salty and tasty.

When herding, herdsmen also bring millet stir-fried in butter, with a handful of fried black beans or soy beans, which are wonderful dry food.

Fig2.2.24 Mongolian traditional yellow food

Green food, mainly wild vegetables, is also a common food for local residents. The geographical environment of the heritage site endows people with rich ecological food materials, such as allium ramosum, wild peas, ferns, centella, moju, xiangxue, tremella, ginseng, agaric, etc. These wild vegetables, pure and natural, pollution-free, delicious taste, rich nutrition, have medicine value and the functions of body building and disease prevention.

Fig2.2.25 Mongolian traditional green food

Ethnic Tea culture and wine culture: milk tea is the most common daily drink of local people, who still maintain the custom of drinking milk tea in the morning and at noon. Although the method of making milk tea varies from place to place, but generally it is made with property proportion with milk, brick tea, salt and water and other raw materials. Mongolian milk tea not only contains rich nutrition, but also contains essential inorganic salts. Drinking milk tea for a long time can reduce fatigue, stimulate excitement, help digestion, enhance appetite, and also has the effect of lowering blood pressure and preventing arteriosclerosis.

Fig2.2.26 Mongolian traditional drink - milk tea

Fig2.2.27 Mongolian traditional beverage – koumiss

Since ancient times, Mongolian nationality has been a bold and unconstrained nation, they like drinking. Drinking and riding reflect the bold and uninhibited character of Mongolian people. They believe that "no wine, no feast" and "no wine, no manners", and wine brings grand atmosphere and joy to guests and hosts and deeply expresses Mongolian people's respect and deep friendship for guests. Since ancient times, koumiss has been deeply loved by Mongolian people and it is an important drink in their daily life and festivals. Generally, it is semi-transparent and low in alcohol content, and it tastes delicate, smooth, sour and sweet, with milk fragrance, and it is of warm nature and has the effect of dispelling coldness, promoting blood circulation, relieving muscles and invigorating stomach, etc.

Unique ethnic cuisine: limited by natural and ecological conditions, local residents have formed a unique ethnic cuisine. Different from the central plains, they are good at roasting, boiling, stewing and other cooking methods. "Roast whole lamb" is one of the most famous dishes in Inner Mongolia. According to legend, it is a favorite court dish of Genghis Khan. The cooks kill and skin the two-year-old sheep, remove the head, hooves and internal organs, and then fix the sheep from head to tail on a stick with a big iron nail, and then mixed egg yolk, salt water, turmeric, cumin powder, pepper powder, white flour and others to paste and apply it all over the sheep, and put its head down into the hot Nang pit and cover the pit tightly and seal with wet cloth, bake for about an hour, take out and serve.

Fig2.2.28 Roast whole lamb

Food environment and food utensils: the food culture of the heritage site not only attaches importance to the delicious food, but also attaches importance to the food environment and the customs in the process. While satisfying people's taste, it also gives people a kind of visual enjoyment.

Mongolian living and diet have the characteristics of rough, bold and unrestrained, unlike the farming people with complicated skills, reflecting the national character of the nomadic nation. In order to adapt to frequent migration, Mongolian catering utensils are generally made of non-easily damaged materials, such as wood, leather, metal and so on. Mongolian people love beauty and show it. The materials, patterns and shapes of these utensils are influenced by nomadic customs and are an important embodiment of grassland culture.

Fig2.2.29 Mongolian catering utensils

Hospitality and catering etiquette: diet and diet activities play an important role in some ceremonies, and have symbolic functions in interpersonal communication, life etiquette and customs and religious worship. There are many local festivals and customs, and great attention is paid to catering and hospitality etiquette, from entering the yurt to leaving, there is a system of etiquette and customs. When welcoming guests, they show their respect to the guests by welcoming them with horses,

presenting hada and toasting to show the hospitality of Inner Mongolia people; when eating sheep, in order to express respect for the guests, they put the sheep head facing the guests, before eating, in the sheep back to draw a cross, and cut the best piece in the middle to the guests to show their welcome; when drinking, the host toast to the guests, and the guests must receive the win glass with both hands and hold it with the left hand, and before drinking, you should bounce to the sky for three times to show respect for the heaven, earth and ancestors. Whenever there is a grand festival or a distinguished guest dining, food is always accompanied by and singing and dancing. During each meal, people sit in a circle and enjoy delicious food and singing and dancing. The melodious Mongolian long songs (Long Tune) and cheerful dancing are integrated with the grassland, blue sky, white clouds and yurts.

Traditional architectural culture

Wisdom of seasonal migration: the architecture symbolizes the landscape of the Mongolian grassland area, and potentially influences the social development of the Mongolian from political, economic, cultural and ethnic aspects. Yurts are one of the important symbols of national cultural characteristics, because of thousands of years of evolution, they have formed a relatively stable aesthetic trend.

Nomadic production mode has a strong seasonality, so they are required to live in places suitable for transfer and transport. Yurts are made from hand-rolling wool felt and "hana (mesh bracket outside yurts)" woven with wickers. The other components are all wool ropes and belts with the characteristic of grasslands. Yurts are simple to make, easy to dismantle and carry, strong and durable. They can resist wind, coldness, fire and rain and highlight the characteristics of saving materials, labor and time, and it shows the wisdom of nomads to adapt to the production mode of seasonal migration.

Fig2.2.30 Mongolian yurts

Integration of space layout and utilization technology: the yurt has a large indoor usable area, and has good indoor air circulation, good lighting, warm in winter and cool in summer, not impervious to wind and rain, so it is very suitable for nomadic people who often transfer between pastures.

The special spatial concept and hierarchical order concept of local residents have a profound impact on the macro and micro layout of their dwelling places. Nomads venerate the right and the west, so the right sides in the yurts are usually the male living area, and the left sides in the yurts are usually the female living area; the innermost part of a yurt, opposite the door, is usually used for displaying objects for respect or belief; the central column of the circular yurts and the surrounding area is a more active area in the Mongolian people's mind, symbolizing the intersection of the past, present and future.

Fig2.2.31 Furnishings of the yurts

Traditional costume culture

As an integral part of Mongolian culture, national costume is a national cultural symbol condensed by the natural belief, aesthetic characteristics, living environment and national character of the local ancestors. In the long-term living and production practice, generations of ancestors used their wisdom and constantly absorbed the essence of national costume, gradually improved and enriched types, styles, material and color, sewing process and other aspects of their traditional costume, and created a

large amount of exquisite costume and greatly enriched the costume culture of the Chinese nation.

The styles and materials are the integration of wisdom in the natural environment: the heritage site are located in the Mongolian plateau, where the cold climate in winter, strong light in summer and nomadic lifestyle require its clothing can resist coldness, UV, mosquitoes and weeds, and also be convenient for riding. Therefore, robes, vests, fur and leather boots are the first choice of their clothing. In the heritage site, men and women, old and young, are very fond of wearing Mongolian robes.

The Mongolian robes are mostly long, with narrow sleeves and wide robes, which are tight at the top and loose at the bottom, with a belt in the middle. For men, the Mongolian robe usually has a lower belt, which makes the part above the belt loose, so it is convenient for working and carrying things. The Mongolian robe is made of different materials in four seasons, lined robes in spring, single-layer robes in summer, cotton-wadded robes in autumn and fur robes in winter. For in winter, it can prevent coldness and protect leg joints, and in summer it can prevent mosquito bites and scratches by grass, and the design fits the living environment.

Fig2.2.32 Festival Mongolian robes for men and women

Color is a natural reflection of national character: the local costume shows the national aesthetic and cultural characteristics. They love and respect white, blue

and red. White symbolizes truth, purity, integrity and beauty in human social life; blue (including green) symbolizes the blue sky and green grass in nature, representing eternity and constancy; and red symbolizes the sun, the source of all things, representing warmth, vitality, light and happiness. In addition, local people also have a special preference for gold, silver and yellow, which are considered as symbols of wealth and heroes. These preferences are the psychological reflection of the nomadic production and life style of the local people for a long time. Therefore, the clothing is often used in white, gold, blue and red in color to reflect the generous, straightforward character of Mongolian herdsmen.

Patterns are the externalization of national aesthetics and belief: costume patterns，formed with the emergence of clothing，are a special form of artistic expression and the most real and direct reflection of people's aesthetic concept. The most important costume pattern of local people is animal pattern, because animals are the basis of herdsmen's survival in nomadic life. The animal patterns they admire not only symbolize the animal images, but also symbolize the tenacious vitality embodied in the animals. Generally, they use deer, butterflies, fish, dragonflies, five animals (cattle, horses, goats, sheep, and camels), birds, beasts, etc.; bats symbolize longevity and health, cattle and horses symbolize adamancy, fish is a symbol of freedom, tigers, lions, and eagles symbolize heroes. Various patterns are mostly located at the collars, cuffs, belts and hems of the robes, which show the ancestors' desire for a better life and their devout worship of the forces of nature.

Traditional traffic culture

Lele carts: Lele carts are one of the main means of transportation of Mongolian nomads. It is rich in ethnic characteristics and has the reputation of "boat on the grassland". In the long-term of nomadic life of "grazing with water and grass and living in impermanent places", Lele carts have become the main means of transportation for the local people in daily life, such as transfer between grasslands and migration, moving yurts, transporting firewood and fuel, etc., and it is also an indispensable part for Mongolian people living on the grassland.

Lele carts have huge wheels, usually about 1.4 or 1.5 meters, which make it extremely adaptable to the terrain, no matter it is short-distance transport or long-distance migration, no matter it is dense pastures or fields covered with snow, no matter it is muddy wetland or rugged slopes, Lele carts can drive smoothly, so they

have the good reputation of "fast boat on the grassland". During migration, Lele carts are linked one by one, forming a long team, even a delicate woman can drive more than a dozen of carts. A huge cart team composed of a dozen or even dozens of Lele carts move between the green grass and the blue sky, traveling thousands of miles with melodious bell, which is unique scenery on the grassland, and shows the Mongolian people's unique folk customs.

Fig2.2.33 Open and covered Lele carts

Mongolian horses and horse culture: Mongolian nationality is famous for its title of "the horseback people". "Mongolian horse" are one of the main horse breeds in north China, and they have robust bodies, wide chests and long mane and thick fur, so they can endure extreme heat and mosquitoes in summer and severe coldness in winter. In nomadic production, the horses are an important tool of production, as well as an important object of production. And horses are needed to grazing, riding, pulling carts, migration, and protecting flocks of sheep and goats.

The ancestors here loved, trained and respected horses. Today, horses are still an indispensable means of transportation in the heritage site, and they show the value of tourism and culture. The long-time historical practice and the merits of horses brought to the Mongolian nationality have created the custom of horse worship. Local herdsmen, regardless of male, female, old and young, can almost ride horses, and children at the age of five or six can graze animals with their fathers and brothers. In addition, the horse is the condensation and symbol of the nomadic culture and the proud cultural totem of nomadic nation. First of all, the horse is a symbol of wealth and prosperity. Only with the development of the horse can other industries be promoted. Secondly, the horse symbolizes prestige, spirit and luck, arousing Mongolian people's inner passion and reverence for nature.

2) Social culture

Festivals and customs

Festival Obo: Festival Obo is a local traditional custom and one of the Mongolian grand sacrificial activities. Obo is a Mongolian language, which means a pile or drum. The ancestors believed that the mountains were tall and majestic, and there was a way to the heaven, so they express their respect for the mountains and the gods by offering sacrifices to Obo.

Obo is a cone-shaped solid tower piled with stones. Festival Obo is generally in May or July of the lunar calendar, when there is plenty of water and lush grass, cattle, sheep and goats are strong, and it is the golden season on the grassland. During the sacrificial ceremony, people place tree branches beside Obo and offer whole sheep, koumiss, butter and cheese, and lamas burn incense and light fires and chant sutras, and herdsmen turn around Obo from left to right for three rounds, praying to the god to eliminate disasters.

Fig2.2.34 Obo and Obo sacrificial ceremony

Nadam Fair: The Nadam Fair is an entertainment fair held to celebrate the harvest. This national sport and entertainment activity includes sacrifice, competition, entertainment, and blessing. Over the years, the content and expression forms of Nadam has changed constantly, but wrestling, archery, horse racing and other traditional national sports performance still keep the main body of Nadam. Nadam festival originated from Obo belief, and it contains the historical memory of Mongolian people's migration, reproduction, production and living, so it is the concentrated embodiment of Mongolian history, religion, values, customs and culture.

The activities of Nadam Fair are the demonstration of strength and beauty, the contest of physical strength and wisdom, the contest of speed and endurance, which

has extensive and profound cultural connotation and reflects the values and aesthetics of the Mongolian nationality.

Fig2.2.35 The grand occasion of Nadam Fair

Celebrating White Festival: Spring Festival is the most important festival for Mongolian people, they advocate white and call the first month of a new year as "white month", so they call the first day of the New Year as "white festival". At noon, the whole family gets together and eats boiled meat and toasts to the aged, and the more meat, the better, which symbolizes they have enough meat, food and clothing in the new year. At dusk, the elders in the family lead the family, facing ancestral graves, to burning wine, meat, cloth and other offerings to offering sacrifice to their ancestors. In the evening, they light a bonfire, the whole family walk around the fire from left to right for three times, while walking they beat their clothes, hoping to eliminate the filth and diseases left by the passing year and enter the new year healthy and clean.

Culture and art

Folk songs: national music is produced and spread in people's production, labor and social life, which can directly reflect the social history and local customs of a nation. People in the heritage site have mastered the use of musical instruments in their life and production activities since ancient times, and integrated music into production and life. In every family, musical instruments have been an essential item since ancient times.

Music carries their historical memory, life perception and life wisdom, and is the most vivid way for them to express their emotions. In the music world of Mongolian people, the cultural characteristics and spiritual character of the grassland nationality are permeated everywhere. They use music to infect the livestock that abandon their youngs, and let the beautiful music move the love between the mother and child animals; they also attach great importance to the inheritance of music, for the young children and adults, they will make some appropriate musical instruments according to their body condition and carry out hands-on education; they cherish the musical instruments, and horse head string instrument is the most representative instrument of Mongolian nationality. Its biggest characteristic is that, like making yurts it is made from wood, mane and leather, without other materials; the original resonator and mask of horse head string instrument were painted green to symbolize the scenery of the grassland. They also decorate the horse head string instrument and sihu (a Mongol four-stringed instrument) with precious metal, bones and gems, and ingenious women can sew colorful ribbons to add artistry to the performance.

Traditional etiquette: the local residents are not only simple and kind, but also pay great attention to etiquette.

It is the lark that sings the sweetest melody,

Civilized people should be polite;

No feathers, no wings to fly,

No manners, even the most beautiful appearance will be laughed at.

Mongolian people pay attention to politeness and etiquette. Mongolian traditional etiquette culture is the crystallization of Mongolian kind-hearted, simple and sincere spiritual world, as well as the code of conduct and moral code of respecting the old and loving the young and living in harmony, which is mainly reflected in the following aspects:

① Greeting and hospitality

Mongolian people have been hospitable since ancient times. At the heritage site, no matter acquaintances or strangers, they always greet each other warmly when they meet, and then they put their right hand in front of their chest and bow slightly to invite guests to sit in their yurts or houses. When the guests sit down, the whole families sit around the guests to give them their assiduous and thoughtful attention, like their own families. The hostess carries sweet milk tea before the guests with both

hands. The teacups are always full, never half full, or it is considered impolite. Tea is also served to guests with milk silk-skin, butter, millet stir-fried in butter and cheese.

② The rites of presenting hada

Hada is a Lamaism ritual and respect gift, as well as a gift for celebration and mourning. In the heritage site, hada is regarded as the most holy, auspicious and noble thing. Generally at the beginning of the New Year, they will be used for worship to the Buddha and the younger generation greeting the elders; on the wedding banquet, presenting hada to the honored guests expresses the noblest etiquette; if there are distinguished guests in the house, before drinking, the host presents hada to the guests to express respect.

Fig2.2.36 Presenting hada

3) Spiritual culture

Worship of the gods

The object widely believed by ethnic minorities in the north is heaven. This kind of worship originates from the natural worship of shamanism, which advocates that " everything is spiritual ". The heaven, earth, sun, moon and stars, mountains and rivers are all highly respected.

Mongolian people regard "the heaven" as the eternal highest god, so it is called "Immortality Heaven". The Mongolian people believe that Immortality Heaven gives people everything. Worshiping Immortality Heaven means worshiping nature, obeying the laws of nature and protecting the ecological balance. They sincerely

believe that as long as they can get the protection of Immortality Heaven, there will be plenty of water and lush grass and the livestock will be thriving and the people's life will be guaranteed.

Hero worship

Harsh natural environment and hard productive labour have resulted in the optimistic spirit of the grassland people advocating heroes. Local people advocate heroes represented by Genghis Khan. The worshiop of great men is the character that nomads constantly break through themselves, innovate ceaselessly and have the courage to realize personal and social values , and is the national character formed by the long-term accumulation of grassland culture. This is not only a unique artistic achievement of nomadic civilization, but also an important cultural resource and spiritual wealth.

(2) Value system

1) Harmonious ecological view of Respect nature

The ecological thought is the essence of Mongolian traditional culture. During long-term nomadic activities，residents in the heritage site gradually recognized and realized that nomadic society was a complicated and relatively interactive ecological system which was composed of three factors: people, livestock and grassland. Based on the nation’s survival needs, local residents developed the ecological concept of respecting nature on the basis of actively integrating into nature, feeling grateful, kindly treating nature and revering nature.

The ideology of Shamanism – “the heaven is father and the earth is mother”, “everything is spiritual”, “revering nature” inherently bounded the ancestors in heritage sites to consciously conform to nature to think about environmental problems and take corresponding actions. They set protecting nature as the priority then personal benefit during their daily life, they would not do any harm to the nature. For example, Mongolian yurts which used branches as supports and blankets made of animal fluff as enclosures to show the wisdom of local residents to "take it from nature, but also return to nature"; herdsmen used cow and sheep dung and dead branches as fuel, and did not damage trees; prohibited to wash dirt or drown in river or lake represented protection and loving of the nature. They firmly believed that

people will only get the generous rewards from nature by actively adapting, appropriately using, rationally transforming nature, actively protecting the environment and "letting nature take its course"; people will suffer from ruthless punishment from nature if they break ecological balance, plunder nature, blindly seek for things or recklessly waste the treasures from the God.

2) Self-reliant and fearless heroic optimism

Advocating heroes and advocating heroic optimism were particularly prominent in the heritage site. Long-term nomadic life had created people's extremely strong resistance and endurance to extreme heat and cold. They faced the doom of trauma and failure directly. They were self-confident and self-reliant, not afraid of difficulties, and going ahead with difficulties. Under the existing natural conditions, the constant exploration of innovation in the pursuit of production and lifestyle, and the courage to explore in the process of getting rich all embodied the heroic optimism of self-reliance and fearlessness.

3) The spirit of emphasizing sincerity and upholding righteousness

As the creator and practitioner of grassland culture, the Mongolians advocated the core value of “setting life on sincerity, matching the heaven with sincerity, acting based on sincerity, allying based on loyalty”, they treated internal sincerity to heart and external sincerity to people as the biggest glory while faithlessness and dishonesty as the greatest shame.

In their daily life, they would not bolt or lock the blanket of Mongolian yurts and the door of vehicles. If any animals got lost, people who found it would bring it to appointed location so that the one who lost livestock may easily get them back. There may not be any houses in several hundreds or decades miles in the vast grassland, thus people who walked far away would always get gratuitous help for food and accommodation. This national spirit of caring, courtesy and hospitality has been melted into the national blood and remains until today.

(3) Social organization

1) Social maintaining function of traditional national sports

As a festival type in nomadic culture, Nadam is periodic. As grazing is based on families, each family lives comparatively scattered and the contact between them is not close. Sports represented by Nadam provide opportunities for the residents of everywhere to gather and communicate, which helps to communicate feelings, exchange production and life information, and helps to generate a sense of identity, pride and belonging feelings for national culture. This increases the centripetal force and cohesion of the nation.

2) Life link under emphasizing sincerity and upholding righteousness value

The Mongolians stress to treat people with sincerity and to help others sincerely, the spirit of sincerity and honesty constitutes the most basic feature of grassland culture. In heritage site, if the grazing activity of one family has to be interrupted due to objective reasons (e.g. going out for work, bad physical conditions etc), neighbors and friends will initiatively bear the responsibility to help them graze, the cattle and horses of two families will be transferred together, after return to the grassland, the livestock and the young will be returned to the family which cannot nomadize in person. Gradually, there will form a close and mutually helping relationship among several families, which becomes one of the maintaining methods in modern society.

2.2.5 Landscape Characteristics

(1) Spatial pattern of the landscape

1) Type and spatial distribution

Landscapes in the heritage site show distinct spatial differentiation: the “Hansan National Nature Reserve” in the middle divides heritage site into three areas: the “winter and spring pastoral area” in the South mainly consists of grassland and also some farmland, its social economy is comparatively developed, therefore the types of landscape is comparatively diverse; the Hansan nature reserve in the middle is overwhelmed by forests with less grassland and no farmland, overall the vegetation

coverage is relatively high but its use is regulated by relevant national nature reserve laws; the “summer and autumn pastoral area” in the North is dominated by grassland.

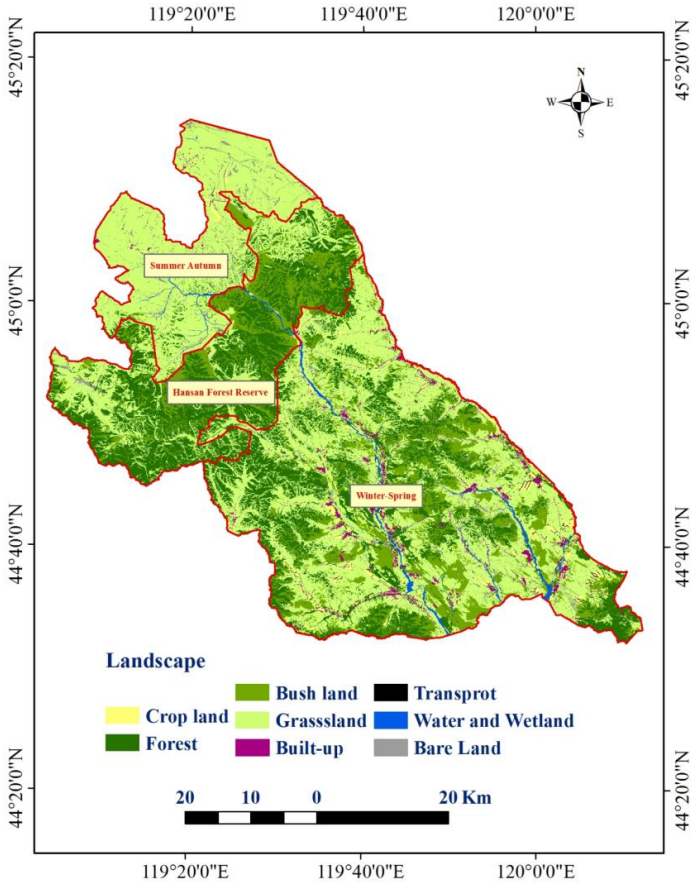


Fig2.2.37 Landscape classification map of heritage site

2) Area and proportion

Landscape area: The total area of heritage site Bayanwenduer Sumu is 337523.4 ha (3375.234 km^2), mainly composed of grassland, forest and shrub. The area of grassland, forest and shrub is respectively 51349 ha (513.49 km^2), 91010 ha (910.1 km^2)and 50857 ha (508.57 km^2). Besides, there still has some farmland and barren land.

Landscape Structure: Calculated by the proportion (%) of land area coverage by all kinds of landscape types, the rankings of these eight main landscape types in heritage site, from large to small for, is: grassland 51.32% > forest 26.96% > shrub 15.07% > farmland 2.43% > barren land 2.32% > water and wetland 1.17% > transportation 0.37% > built-up land 0.36%.

Tab2.2.11 Landscape Area of Bayanwenduer Sumu in 2019 (Unit: Hectare)

	Crop	Forest	Bush	Grass	Built-up	Transport	Water	Bare	Total
1.Winter Region									
Alatanwenduer Gacha	309.96	1071.64	1052.68	5285.08	37	25.28	266.2	400.8	8448.64
Arihubu Gacha	147	1027.28	4121.88	4288	59.68	70.56	328.48	167.4	10210.32
Armusier Gacha	245.36	236.72	580.92	1991.52	40.04	25.68	206.44	284.7	3611.36
Baorihot Gacha	478.96	493.96	707.72	2015.72	34.44	31.4	61.6	73.48	3897.28
Bayanbaolege Gacha	118.8	2639.16	743.2	5122.52	34.92	47.4	4.36	188.5	8898.84
Bayanchagan Gacha	228.12	4056.52	2222.24	11364.04	75	75.44	474.04	602	19097.44
Chaganaobao Gacha	766.72	842.56	584.4	2921.64	25.64	33.24	50.6	74.88	5299.68
Daerhanwula Gacha	371.72	2386.56	1813.84	4608.16	48.16	46.32	15.52	130	9420.28
Debule Gacha	282.28	626.6	938.32	2744.16	30.36	18.2	168.4	295.4	5103.72
Genpimiao Forest Station	1.8	2279.32	614.72	448.24	6.44	20.56	0.2	2.32	3373.6
Gibutu Gacha	353.6	885.04	1659.52	2641.44	71.72	29.6	274.36	148.8	6064.04
Halasuta Gacha	172.88	1871.48	973.48	2733.24	90.88	38.44	123.44	235.1	6238.92
Harinuoer Gacha	225.68	755.32	1127.24	2340.6	37.4	12.76	82.2	203.7	4784.88
Herimu Gacha	131.64	1745.52	2395.36	2736.4	100.8	46.88	157.2	231.1	7544.88
Lagashaihua Gacha	524.28	491.88	199.84	2005.56	33.72	26	3.12	48.64	3333.04
Manitu Gacha	1397.68	10765.44	4750	16050	156.2	111.88	204.12	298.4	33733.72
Maohaoer Gacha	157.72	167	250.4	1978.48	14.72	16.2	21.12	139.8	2745.4
Najie Gacha	381.12	1771.68	2518.96	1791.96	33.76	27.36	130.2	321.7	6976.76
Narisutai Gacha	849.8	3364.68	1526.56	13969.88	82.16	152.64	231.12	437.3	20614.12
Shabaritai Gacha	253.6	2854.6	2429.04	2999.68	41.88	36.32	133.12	227.8	8976.04
Sharibaote Gacha	284.28	5865.56	544.32	6335.6	53.4	13.92	28	150	13275.04
Uridunajie Gacha	101.8	909.08	1015.36	1821.92	33.04	14.2	23.56	132.7	4051.68
Sub-Total	**7784.8**	**47107.6**	**32770**	**98193.84**	**1141.36**	**920.28**	**2987.4**	**4794**	**195699.7**
2.Nomadic Corridor									
Hanshan Forest Reserve	**0.2**	**42317.92**	**17836.76**	**23675.24**	**12.36**	**62.44**	**324.12**	**681.6**	**84910.68**
3.Summer Region									
Talinhua Gacha	314.08	1583.56	250.72	34864.52	76.32	178.96	543.8	1425	39236.88
Yatute Gacha	100.08	1.2	0	16484.4	21.84	63.6	84.04	921	17676.16
Sub-Total	**414.16**	**1584.76**	**250.72**	**51348.92**	**98.16**	**242.56**	**627.84**	**2346**	**56913.04**
Total	**8199.16**	**91010.28**	**50857.48**	**173218**	**1251.88**	**1225.28**	**3939.36**	**7822**	**337523.4**

Tab.2.2.12 Landscape Structure of Bayanwenduer Sumu in 2019 (%)

	Crop	Forest	Bush	Grass	Built-up	Transport	Water	Bare
1.Winter-Spring Region								
Alatanwenduer Gacha	3.67	12.68	12.46	62.56	0.44	0.30	3.15	4.74
Arihubu Gacha	1.44	10.06	40.37	42.00	0.58	0.69	3.22	1.64
Armusier Gacha	6.79	6.55	16.09	55.15	1.11	0.71	5.72	7.88
Baorihot Gacha	12.29	12.67	18.16	51.72	0.88	0.81	1.58	1.89
Bayanbaolege Gacha	1.34	29.66	8.35	57.56	0.39	0.53	0.05	2.12
Bayanchagan Gacha	1.19	21.24	11.64	59.51	0.39	0.40	2.48	3.15
Chaganaobao Gacha	14.47	15.90	11.03	55.13	0.48	0.63	0.95	1.41
Daerhanwula Gacha	3.95	25.33	19.25	48.92	0.51	0.49	0.16	1.38
Debule Gacha	5.53	12.28	18.39	53.77	0.59	0.36	3.30	5.79
Genpimiao Forest Station	0.05	67.56	18.22	13.29	0.19	0.61	0.01	0.07
Gibutu Gacha	5.83	14.59	27.37	43.56	1.18	0.49	4.52	2.45
Halasuta Gacha	2.77	30.00	15.60	43.81	1.46	0.62	1.98	3.77
Harinuoer Gacha	4.72	15.79	23.56	48.92	0.78	0.27	1.72	4.26
Herimu Gacha	1.74	23.14	31.75	36.27	1.34	0.62	2.08	3.06
Lagashaihua Gacha	15.73	14.76	6.00	60.17	1.01	0.78	0.09	1.46
Manitu Gacha	4.14	31.91	14.08	47.58	0.46	0.33	0.61	0.88
Maohaoer Gacha	5.74	6.08	9.12	72.07	0.54	0.59	0.77	5.09
Najie Gacha	5.46	25.39	36.11	25.68	0.48	0.39	1.87	4.61
Narisutai Gacha	4.12	16.32	7.41	67.77	0.40	0.74	1.12	2.12
Shabaritai Gacha	2.83	31.80	27.06	33.42	0.47	0.40	1.48	2.54
Sharibaote Gacha	2.14	44.18	4.10	47.73	0.40	0.10	0.21	1.13
Uridunajie Gacha	2.51	22.44	25.06	44.97	0.82	0.35	0.58	3.28
Sub-Total	**3.98**	**24.07**	**16.75**	**50.18**	**0.58**	**0.47**	**1.53**	**2.45**
2.Nomadic Corridor								
Hanshan Forest Reserve	**0.00**	**49.84**	**21.01**	**27.88**	**0.01**	**0.07**	**0.38**	**0.80**
3.Summer-Autumn Region								
Talinhua Gacha	0.80	4.04	0.64	88.86	0.19	0.46	1.39	3.63
Yatute Gacha	0.57	0.01	0.00	93.26	0.12	0.36	0.48	5.21
Sub-Total	**0.73**	**2.78**	**0.44**	**90.22**	**0.17**	**0.43**	**1.10**	**4.12**
Total	**2.43**	**26.96**	**15.07**	**51.32**	**0.37**	**0.36**	**1.17**	**2.32**

3) Sub-region features

In terms of the function, the total land in the heritage site is divided into three sections – winter and spring pasture in the South; summer and autumn pasture in the North; the Inner Mongolia Gogestai Hanwul National Nature Reserve (Hansan Forest Reserve) between these two pastures.

a. Winter-Spring Region

It is located in the southern part of heritage site with relatively low altitude and high temperature, including 22 Gacha and 1 forest ranger station. The grassland area of this section covers 50.18% of the whole region, similar to the whole level of the heritage site. The proportion of farmland in this section is 3.98% which is the highest among three sub-regions. The main function of this region in the nomadic system is to provide the last resort for cattle and sheep in harsh winter and spring when grass is scarce and temperature is very low.

b. The function of Hansan Reserve in the nomadic system

Hansan Nature Reserve serves three functions to the **nomadic system:**

Firstly, it provides a safe ecological system (water source conservation; water and soil conservation; biodiversity conservation) for both southern and northern pastures; secondly, it provides a reliable and grazable corridor - the Reserve set a nomadic passage with a width of 60m for the use of nomadic system; thirdly, based on corresponding law for national nature reserve, the “buffer zone” on the most peripheral of the Reserve could be used if properly managed. The quality of grassland here is the best, it can be used as clipping pasture in winter and spring.

c. Summer-Autumn Region

It is located in the northern part of heritage site with relatively high altitude and low temperature, containing 2 local Gachas for year-round grazing and 22 Gacha for grazing in summer and autumn. The grassland area of this section covers 90.22% of the whole region. Besides of pasture, this section is also the base of wind electricity. While a clean energy, wind electricity facilities have some adverse effect on grassland and grazing, among others.

Summer pasture space sub-region management: according to tradition, summer pasture is divided into six grazing sub-regions. Among them, “Talinhua Sub-region” and “Yatute Sub-region” belong to local two Gachas, the other 22 Gacha from south

share other four sub-regions: “Ulanhada Sub-region”, “Baoriwenduer Sub-region”, “Hundulun Sub-region” and “Chaganwenduer Sub-region”. However, with boundary adjustment in Hansan nature reserve, “Chaganwenduer Sub-region” has been naturalized to nature reserve, so there are only five sub-regions in summer pasture at present.

Time management for summer pasture grazing: the growing season for forage grass in summer pasture is comparatively short, usually the grazing time starts at June.1st and ends at around Oct.31st. During this period, depending on each area, cattle and sheep from 22 Gachas from the south will be arranged to graze according to altitude height. At later stage, with temperature descending and heavy snow blocking mountains, the grazing condition gets worse, cattle and sheep start to return to winter-spring region in the south.

4) Major scenery of three regions

Winter-Spring Region: The southern part of Hansan is mainly covered by woodland and grassland, however it still has certain proportion of farmland, the economic condition is relatively developed. The main types of vegetation include: sparse grassland (elm-grassland); shrub grassland (caragana-grassland); river grassland; mountain grassland and food resources from agricultural by-products.

a. Sparse Grassland (elm+grassland)

b.Shrub Grassland (caragana + sand land grassland)

c. Bench Land Grassland

d. Mountain Grassland

e. Agriculture: By-products

f. Architecture Buildings

Fig2.2.38 Landscape of Autumn-Spring Region in Bayanwenduer (July, 2019)

Hansan Forest Reserve: three nomadic roads pass through the Reserve: the western and middle roads go across the reserve but quarantined from the Reserve with a 60m wide guardrail. The grassland in the buffer zone of the Reserve can be used as clipping pasture to make forage.

Fig2.2.39 Inner Mongolia Gogestai Hanwula National Nature Reserve

a. Birch Forest + Grassland

b. Mongolia Oak Forest + Grassland

c. Low Shrub

d. Fallen Leaves Coniferous Forests: Larix Gmelinii + Grassland

Fig2.2.40 Landscape of Summer-Autumn Region in Hansan Forest Reserve (July, 2019)

a. Mongolia Yurts in Summer Camp

b. Plateau Grassland

Fig2.2.41 Landscape of Summer-Autumn Region in the heritage site (July, 2019)

The Talinhua Gacha and Yatute Gacha, living in the "summer-autumn region" year-round, graze locally. Besides, this region newly added large-scale wind electricity facilities in recent years.

Fig2.2.43 The prospect is the wind electricity field in Talinhua Area

(2) Seasonal changes of the landscape

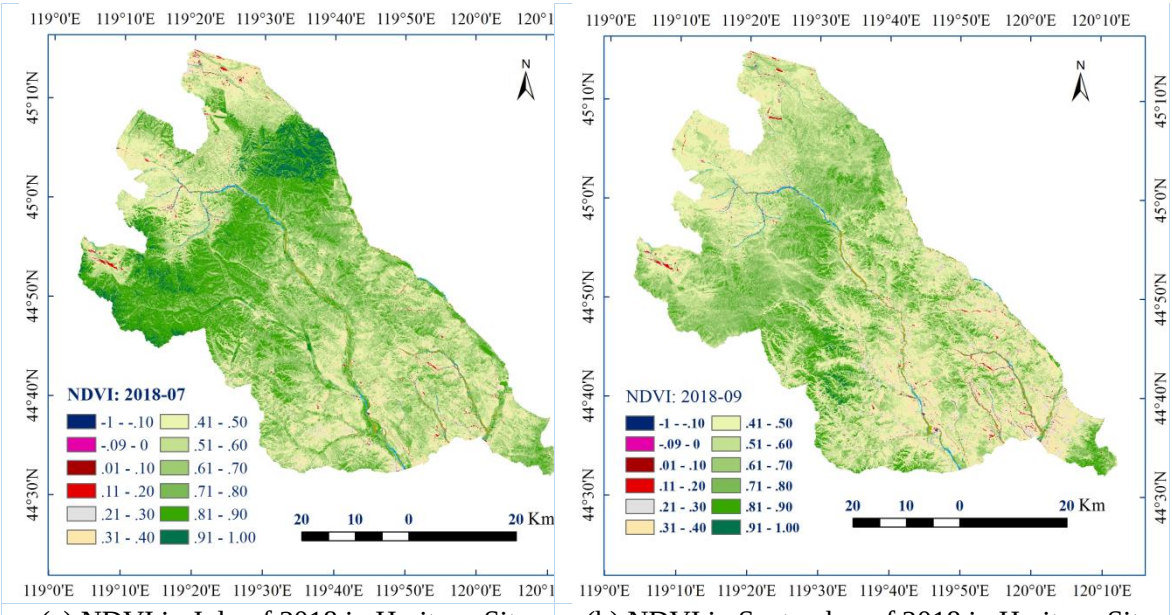
The rhythm of grassland nomadic system is affected by natural temperature and precipitation, therefore subjects to inter-annual variations. However, in a typical year, the basic pasture process will be shaped by the quantity of grassland biomass. Usually,

at the beginning of June, those 22 Gacha in Winter-Spring Region of Hansan southern part start to proceed to the north along three nomadic routes to start a five-month long nomadic life.

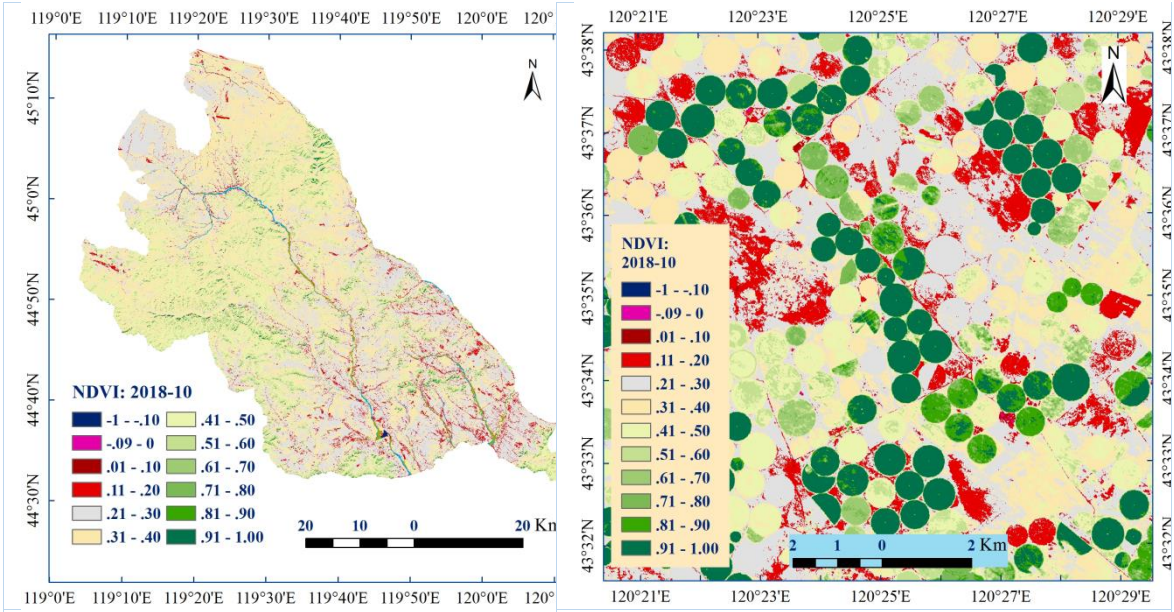
(1) In July and August, with the improvement of temperature and precipitation condition, the vegetation coverage in the whole region reaches its primes. In July of 2018, Figure a shows that the NDVI in middle Hansan Reserve is obviously the highest, usually more than 0.8; except for some barren land, the NDVI in summer-autumn region is also usually above 0.4.

(2) In September (below Figure b), NDVI already starts to descend, the NDVI in Hansan Reserve descends to 0.5 – 0.7, the NDVI in northern summer-autumn region is mostly under 0.4. In October (below Figure c), except for some evergreen trees, the NDVI in Hansan Reserve mostly descends to under 0.5, green color can hardly be seen in summer-autumn region. At that time, temperature decreases, sometimes starts to snow, grassland stops to grow, only withered grassland left, sometimes animals needs to look for food beneath snow. Normally at the end of October, the nomadic army begins to return to the winter-spring region.

(3) In winter and spring, besides of grazing in reserved winter-spring region, by-products from agricultural areas are also a source of food. In addition, in sand land in Horqin in the south, the large-scale development of artificial grassland in recent years (below figure d) is another source of food for cattle and sheep in winter and spring.



(a) NDVI in July of 2018 in Heritage Site (b) NDVI in September of 2018 in Heritage Site



(c) NDVI in October of 2018 in Heritage Site

(d) NDVI in October of 2018 in Horqin Sand Land Artificial Grassland

Fig2.2.44 Seasonality of landscape in the heritage site

3. Action Plan for the Proposed GIAHS Site

3.1 Threats, Challenges, Potentials and Opportunities

3.1.1 Threats and challenges

(1) The traditional livelihood strategy of herdsmen faces challenges of both part-time farming and non-farming

In nomadic system of Ar Horqin Grassland, herdsman is the most important crucial factor. However, the heritage system which is located at the region with comparatively backward economy and fragile ecology is facing relatively prominent conflicts among popularity, economy, culture and resource environment. With the rapid development of regional economy, more and more herdsmen choose to transfer their livelihood strategies. This transfer showed in micro level is that herdsman transferred to part-time herdsman or non-herdsman, in heritage system level is that pure agriculture system transferred to integrated system of primary, secondary and tertiary industries. In details, from 2014 to 2018, the proportion of pure herdsmen, part-time herdsmen and non-farmers in heritage site changed gradually. The proportion of pure herdsmen in total agricultural labour in heritage site gradually descended, from 64.73% in 2014 to 60.88% in 2018; the proportion of part-time herdsmen and non-farmers in total agricultural labour in heritage site respectively increased from 32.54% and 2.73% in 2014 to 35.24% and 3.85% in 2018.

However, with the transfer of livelihood of herdsmen, their production and life behaviours changed accordingly. For example, herdsmen’s selection on the method and route of nomadic, the consumption methods and usage of energy by farmers will all change, which must have negative influence on agricultural culture heritage.

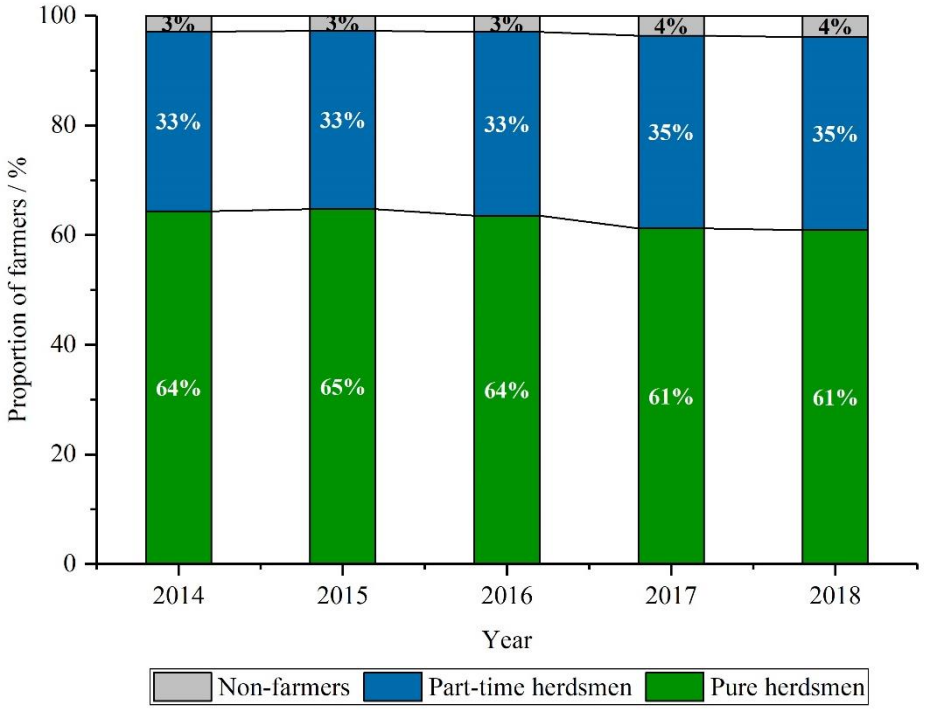


Fig3.1.1 The qquantity change ssituation of each kind of hherdsmen in hheritage site

(2) General aging of traditional knowledge and technology owners

In traditional Mongolian nomadic technology system, the technique in experience format mainly for experience and technical skills occupies a dominant position, the key point for traditional nomadic technology inherit is oral and heart-to-heart inherit which is lively, but at present, aging trend happens in people group who possess those traditional technical skills, with successive pass-away of those inheritors and decreasing of numbers of traditional husbandry practitioners, the traditional grassland nomadic knowledge and corresponding technology is facing threat of losing.

(3) Rapid urbanization developing speed affects protection and inherit of traditional culture

In present era of industrial civilization economy development, modern production and life methods impact traditional Mongolian nomadic life. The development of modern information technology changes traditional nomadic methods, those traditional nomadic cultural resources gradually fade away, even disappears at

the same time of people enjoying achievements of modern civilization. The development of modern husbandry leads Mongolian herdsmen also move into brick houses, Mongolian yurt-style grazing and migration life can rarely be seen in grassland now; Mongolian robes, changed from indispensable daily clothes to dresses only for special occasions such as festivals, weddings and sacrificial activities; the excellent Mongolian folk customs have suffered from unprecedented challenges, they are gradually wrongly read or ignored by people.

With the rapid development of urbanization, the consciousness of protection of this nation's people is weakening day by day, they take granted for the development direction and whether it can be inherited or not, the apathy attitude which let it emerge and perish of itself leads under-appreciation of education and economy function of excellent Mongolian culture and makes it facing danger of "lost inherit". Added that the competitiveness of Inner Mongolia regional economy and culture is not enough, the digging of grassland culture during the process of inheriting and innovating traditional Mongolian culture is not sufficient, the exploration and analysis of culture expression forms is not enough, the development of culture industry is single, which makes culture resource in heritage site difficult to gain attention from herdsmen neither to obtain position in market, the protection and inherit of it is facing severe pressure.

(4) The increasingly acute contradiction between agriculture and husbandry leads to soil desertification

Unsuitable grazing leads to increasingly acute contradiction between agriculture and husbandry and other social issues, may lead to soil desertification and other environmental problems. The characteristic of soil changes through returning to soil by trampling and discharges, if nomadic too much or trample too strongly, it may have adverse effect on plant growth, long-term nomadic may decrease plant form diversity in grassland, more seriously, it may change root exudates, nutrient cycling and other process in plants. Unsuitable nomadic makes texture of grassland soil become rough, rate of vegetation litter returned to organic matter decrease, vegetation coverage decrease, above-ground biomass of plants decrease, and then leads to intensified wind erosion, degradation and desertification. From the angle pursuing interest, nomadic normally gathers in position with lush vegetation which is good for

grazing, however this kind of selfish behavior may lead grassland ecology, especially grassland ecology with high productivity suffer from larger threats than grassland degeneration.

(5) Road management for Summer-Autumn Region

1) Road issues in Summer-Autumn Region

Unlike winter-spring region in the south where most of the roads are permanent and fairly-maintained, most part of the road system in northern summer-autumn region is seasonal and poorly maintained. Roads on the grassland are restricted by uncertain factors such as runoff, erosion gully, sediment deposition, and steep slope, these restriction are more obvious in summer and autumn. Facing these traffic obstacles, one individual has little choose and will be forced to take a detour. As a result, even though there are many roads in grassland, the traffic uncertainty is also that much, in terms of “nomadic”, to solve road traffic problem is the premise of sustainable nomadic in the future.

(a) Road Conditions Deteriorated by Runoffs

(b) Road Threatened by Erosion Gully

(c) Road Covered by Sedimentary Silt, Normal Cars Cannot Pass

(d) Steep, Wet and Slippery Road

Fig3.1.2 Poor road conditions in Summer-Autumn Region of the heritage site

2) Ecological side-effects by motorcycles

As a modern means of transportation, motorcycles are welcomed by herdsmen[2]. However, more and more motorcycles could cause road hardening and grassland degeneration.

Our field survey found that the tracks could be as many as twenty in some part of the region. The soil hardening caused by tracks thwarts the growth of grassland, increases roads runoffs, which causes more soil erosion. In the future, with the increasing cars and grassland tourism, the impact of grassland by road hardening must be paid enough attention.

3.1.2 Potentials and opportunities

(1) GIAHS protection is getting more and more attention from international community, brand value is widely recognized

Starting from 2002 when United Nation Food and Agriculture Organization (FAO) launched Globally Important Agricultural Heritage Systems (GIAHS) protection project, the multi-function value of GIAHS gains attention from more and more countries. At present, Asia, Europe, Africa and America all have GIAHS, the number of countries successfully declared GIAHS is 21, GIAHS has been included in daily work of FAO. Global environment fund, world agriculture heritage fund and other international projects all render important capital support for GIAHS protection project. Non-governmental organizations of GIAHS has been established in eastern Asia area and Europe, GIAHS series products have been developed in China, Japan, Korea and other countries, which are widely welcomed in consuming market. The multi-function value of GIAHS and its brand have already been widely recognized by international community and customers, which creates a good international environment for the protection of GIAHS.

[2] Motorcycles cannot completely replace horses. For example, horses can walk in rugged mountain paths, which is impossible for motorcycles.

(2) Chinese government is pushing unceasingly the protection and development work of China-NIAHS

In 2012, national Ministry of Agriculture (now as "Ministry of Agriculture and Rural Affairs") launched China-Nationally Important Agricultural Heritage Systems (China – NIAHS) discovery and protection work and recognized the first batch of 19 China-NIAHS in 2013 by Ministry of Agriculture. Up to now, 91 China-NIAHS projects have been designated and the fifth batch of China-NIAHS is under selection. The discovery and protection work of agricultural heritage has been written in "Document No.1 of the Central Committee" and national industry development planning for many times. The Ministry of Agriculture and Rural Affairs have published "Management Methods of Important Agricultural Heritage Systems" and is exploring monitoring system of agricultural heritage, and provides project support for the protection and development of agricultural heritage sites. Strong support of governmental policies has provided precious opportunities and wide platform for the protection and development of GIAHS.

(3) The development strategy of primary, secondary and tertiary industries integration and strategy of Chinese rural revitalization have created political opportunities for the protection and development of GIAHS

In order to expand farmers' income channels, in December of 2015, the General Office of the State Council issued "Guiding Opinions on Promoting the Integration Development of Rural Primary, Secondary and Tertiary Industries" on the basis of State Office No. 93 [2015]. The report of the Nineteenth National Congress of the Communist Party of China put forward the strategy of rural revitalization, giving priority to agricultural and rural work. Thereafter, a series of supporting theories have been issued, such as in 2018, the State Council of China published the "Central Committee No. 1" Document "Opinions of the Central Committee and the State Council of the Communist Party of China on the Implementation of the Strategy for Rural Revitalization" and "National Strategic Plan for Rural Revitalization (2018-2022)". Many articles in integration development strategy of rural primary, secondary and tertiary industries and China rural revitalization strategy have close relationship to and the same target as protection and development of agricultural

heritage, which creates unprecedented political environment and development opportunities for the protection and development of GIAHS.

(4) The unprecedented attention gained by food safety makes broad prospects for development of green nomadic livestock products

In recent years, food unsafety incidents frequently happened in market, such as melamine milk powder and milk, lean meat powder, fake beef (use beef paste to turn pork into beef) etc, which makes consumers pay unprecedented attention to food safety, green safe food is highly welcomed, the market sales price of green food increases together. The nomadic livestock herds in Ar Horqin Banner are grazed on the natural and pollution-free grassland, the natural grassland is rich in plant species and nutrients, the growth of livestock is in a purely natural status, and the quality and safety of livestock products are guaranteed. Especially the mutton under Ar Horqin Banner nomadic condition is the top quality item in mutton, the texture of mutton is tenderer with less fat and cholesterol and more protein, the content of fat is less. The content of Vitamin B1, B2, B6 and iron, zinc and selenium is very abundant. Like what the ancient said: eat mutton more, healthily live longer. Therefore, the nomadic livestock product in Ar Horqin Banner possesses wide market prospect.

(5) Local government highly focus on nomadism system agricultural heritage protection whose core is nomadic culture

In order to realize stable development of husbandry and improve production condition, banner committee and government have listed grassland ecological construction as the key work to grasp. Having implementation of the "six million mu project" for ecological construction, completed the 1.7 million mu sand land comprehensive control project with Manjin Manha and Aradi Manha as the core, finished the one million mu ephedra fencing project, comprehensively implemented grassland improvement project and other key construction projects, realized scientific and rational protection and construction of natural grasslands, it lays the foundation for traditional nomadic and husbandry development. At the same time, grassland protection work is further strengthened, balance between grass and livestock is strictly implemented, structure adjustment of husbandry is solidly promoted, the proportion of beef cattle and sheep is increased, which creates conditions to continue traditional

nomadic and husbandry. Meanwhile, Ar Horqin Banner government pays special attention to agricultural heritage protection. In recent years, based on experts' opinions, the government organized seminars and academic exchanges for many times, organized people to deeply research generation, development, protection and other problems of nomadic husbandry, established special organization to fully protect this ancient cultural heritage to prepare for declaration of important cultural heritage.

(6) "The Belt and Road" Initiative opens broad international market space for Ar Horqin Banner nomadic products

Under the background of China's "The Belt and Road" initiative, China has reached many bilateral cooperation agreements with the United Arab Emirates. Inner Mongolia autonomous region government, Ministry of Agriculture and Rural Affairs in China and the United Arab Emirates Cabinet food security office have reached understanding memo on jointly promoting construction of "The Belt and Road" food security project of grass and livestock integrated industrial demonstration garden. China and Arab will take the construction of the demonstration garden as the foundation, focus on the planting and processing of crops, husbandry and breeding (including mutton sheep, beef cattle, cows, etc); breeding, cultivation and fertilizer and feed of excellent varieties in agriculture and husbandry; agriculture, husbandry supply chain and high-tech transportation facilities; Internet + agriculture, husbandry and other fields to cooperate, will build a demonstration garden for herbage planting, processing and animal husbandry in Ar Horqin Banner, Chifeng City. Ar Horqin Banner will provide a long-term supply of livestock products to the United Arab Emirates, which indicates that Ar Horqin Banner products have been recognized by the international community, predicting that it has a broad international market.

(7) The development level of nomadic industrial integration of Ar Horqin Banner is not high, still has large space to develop

At present, the husbandry industry in Ar Horqin Banner belongs to semi-settled nomadism, nomadic products are sold by form of live beef cattle, live mutton sheep, livestock, dairy products of cattle and sheep, primary meat products, industry chain is simple, deep processing of agricultural products with higher additional value has not

been developed. Besides, grassland scene, grassland nomadic life and Mongolian grassland culture are precious tourism resources, and the multi-functions of grassland husbandry possess tremendous developing potential which has not been developed at present, which also means grassland nomadism in Ar Horqin Banner has giant industrial developing space.

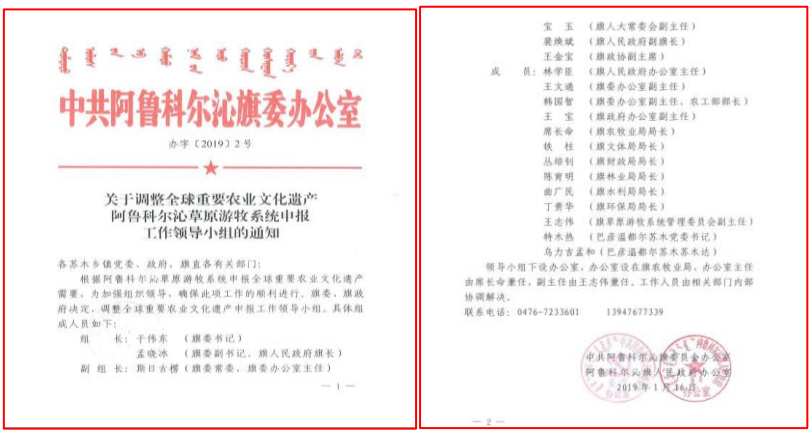
3.2 Actions Taken

In recent years, local government paid special attention to the protection, inherit, development and utilization of nomadic system in Ar Horqin grassland, enhanced works of organization guarantee, system construction, heritage protection, culture propagation, product development and etc, and achieved phased results.

3.2.1 Perfect management mechanism

(1) Establish leading group for agricultural heritage declaration

In order to excavate, protect and inherit Ar Horqin grassland nomadic system this important agricultural heritage, the people's government of Ar Horqin Banner attaches great importance on this work, plans the project with the prospect of science and development. In May of 2013, the declaration work of China-NAIHS was formally started, the government had invested a lot of manpower, material and financial resources in sorting out historical relics, excavating Mongolian nomadic folk customs and making traditional ethnic artifacts. In 2013, a leading group on the declaration of GIAHS headed by the Secretary of the Banner Committee and the Chief Banner Officer of the Government was set up to strengthen the leadership and organizational coordination of the nomadic system. The excavation, protection, inherit and utilization work of grassland nomadic system this important agricultural heritage is an indispensable devotion to enriching and promoting the traditional agricultural culture of the Chinese Nation, has a very important meaning on enhancing the Nation people's recognition and proud of Mongolian culture and promoting communication and integration of Chinese national cultures.



中共阿鲁科尔沁旗委办公室

办字〔2019〕2号

关于调整全球重要农业文化遗产
阿鲁科尔沁草原游牧系统申报
工作领导小组的通知

各苏木乡镇党委、政府，旗直各有关部门：

根据阿鲁科尔沁草原游牧系统申报全球重要农业文化遗产需要，为加强组织领导，确保此项工作的顺利进行，旗委、旗政府决定，调整全球重要农业文化遗产申报工作领导小组。具体组成人员如下：

组　　长：于伟东　（旗委书记）
　　孟晓冰　（旗委副书记、旗人民政府旗长）
副 组 长：斯日古楞（旗委常委、旗委办公室主任）

宝　玉　（旗人大常委会副主任）
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特木热　（巴彦温都尔苏木党委书记）
乌力吉孟和（巴彦温都尔苏木苏木达）

领导小组下设办公室，办公室设在旗农牧业局，办公室主任由席长命兼任，副主任由王志伟兼任，工作人员由相关部门内部协调解决。

联系电话：0476-7233601　13947677339

中共阿鲁科尔沁旗委员会办公室
阿鲁科尔沁旗人民政府办公室
2019年1月16日

Fig3.2.1 The Notification Document for the Establishment of Nomadic System Leadership Group

(2) Establish Nomadic System Management Committee

In 2017, Ar Horqin grassland nomadic system management committee in which the deputy head of the banner in charge was the director and the principal heads of the relevant regions and departments were members, was established to take overall responsibility for heritage declaration work of Ar Horqin grassland. The Management Committee had a full-time deputy director responsible for the daily work; a comprehensive office to coordinate the work; and five specialized offices for heritage declaration, ecological industry development, nomadic culture protection, propaganda and tourism development, and ecological protection of nomadic areas, which were specifically responsible for the development of each special work. Ar Horqin Banner nomadic cultural ecological protection seminar was set up to further enhance industrial management and service.

3.2.2 Perfect System Mechanism

Compiled “Inner Mongolia Ar Horqin Grassland Nomadic System Protection and Development Planning”, specified three-phase developing target of self-improvement, consolidation, increasing from 2013 to 2020. Promulgated a series of policy documents including “Interim Measures for Ar Horqin Grassland Nomadic System Production” to specify each aspect such nomadic protection content, responsibility distribution, development principle, expense guarantee and etc, further regulated protection management of nomadic area.

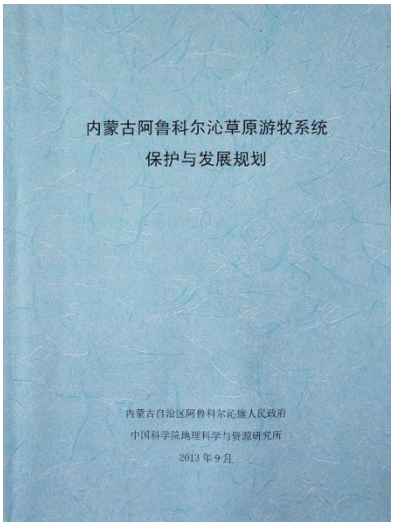

Fig3.2.2 “Inner Mongolia Ar Horqin Grassland Nomadic System Protection and Development Planning”

3.2.3 Enhance ecological protection, perfect protection mechanism

(1) Promulgate corresponding ecological protection policy documents

Formulated and promulgated a series of policy documents such as “Interim Regulation of Ecological Protection and Construction”, “Measures for Incentives for Reporting Illegal Activities in Ecological Environment”, “Measures for Balancing Grass and Livestock”, “Measures for Investigating Responsibility for Fire Prevention in Forest and Grassland” and etc. Starting from 2018, 110 supervisors for public welfare forest and 66 supervisors for grassland ecology had been recruited to conduct management and protection work in nomadic area. Following the "Conference on Promoting the Ecological Protection and Construction of the Whole Banner in 2018" held among the whole Banner on April.27th, 2018, the Banner Grassland Nomadic System Protection and Management Center actively cooperated with the Banner Forestry Bureau, Forestry Security, Grassland Supervision Bureau and Bayanwenduer Sumu, based on corresponding provisions on “Regulations on Restriction of Grazing and the Balance of Grassland and Livestock in Chifeng City”, “Interim Regulations on Further Strengthening Ecological Protection and Construction” (No. 6 [2016] published by the party of Ar Horqin) and “Implementation Plan of Grassland and Livestock Balance Work in Ar Horqin Banner for 2015-2017”(No. 45 [2015] published by the government of Ar Horqin), specified grazing prohibit zone in the whole banner, ranges of grassland and livestock balance and forbidden livestock species in the whole banner, and required the broad masses of cadres and people in the whole banner to be strict with them and complying with relevant regulations to consciously protect grassland and graze according to the law. Based on the conditions that in nomadic area, ecology was fragile, nomadism was over-loaded, desertification and degeneration was severe, loading capacity gradually decreased, carried out specialized livestock clearance action in core zone of Gogestai Hanwul grassland nomadic system. The action group was composed of more than 110 people, the clearance work was carried out under the unified command of the committee, which not only effectively protected grassland, but also took into account the interests of herdsmen

Before clearance action, the action group conducted large amount of propaganda among most herdsmen by means of leaflets distribution, banner hanging, in-house visit and etc. Stops were set in each protected forest station, the action group entered mountain to search for illegal grazing situations and asked herdsmen to evacuate from the Reserve within regulated time after effective communication. During the action, the action group provided herdsmen with service such as driving, dividing and pulling lambs. Punished herdsmen who were not cooperating and fighting guerrilla with the action group according to the law and asked them to evacuate immediately.

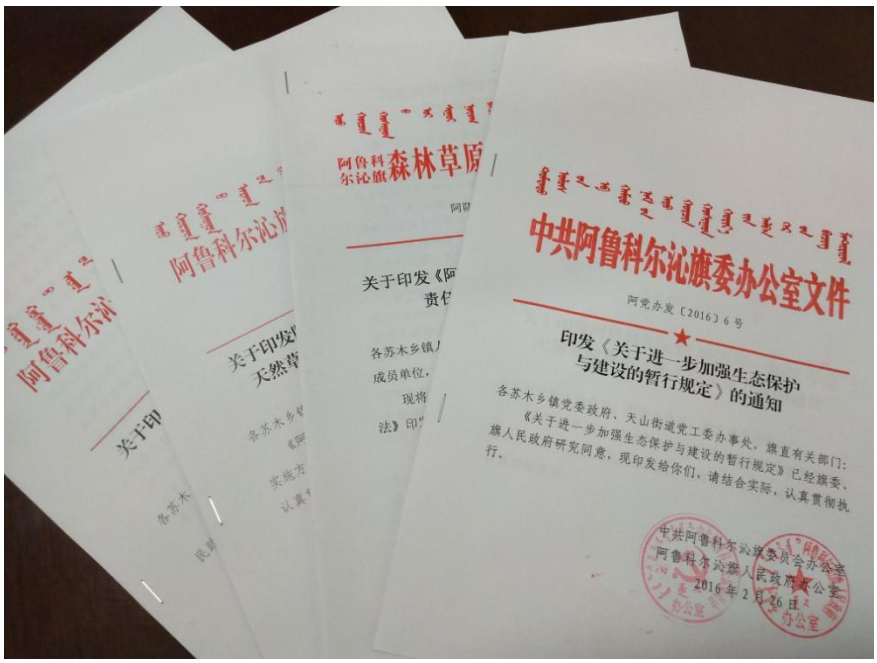

Fig3.2.3 Corresponding policy documents

(2) Implement ecological protection project

The committee and government of Ar Horqin Banner determined developing strategy of “ecological Banner setting”, implemented “three regions” – Hanshan water conservation forest area in the north, eco-construction area of soil and water conservation in the middle and west and sand control area in the southeast; and “six projects” - million mu natural forest protection, million mu sand land comprehensive management, million mu farmland returning to forestry, million mu small watershed management, million mu green agricultural and livestock production base protection, hundred kilometers of ecological construction of Kuhe River connectivity, cumulatively 2.546 million mu water protection and management had been completed,

0.835 million mu of small watershed had been comprehensively managed, 2.903 million mu of wind and sand source in Beijing and Tianjin had been managed, 0.5043 million mu farmland had been returned to forestry. The desertification trend of soil and grassland in our Banner had been contained effectively, regional ecological barrier was basically established, the original nomadic area, the pure land on which the nomadic people relied for their survival, was well protected.

Fig3.2.4 2.546 Million Mu of Water Protection Management

Fig3.2.5 0.835 Million Mu of Comprehensive Small Watershed Management

Fig3.2.6 2.093 Million Mu of Beijing and Tianjin Wind and Sand Source Management

Fig3.2.7 0.5043 Million Mu of Farmland Returning to Forestry

(3) Prevent overgrazing

First, Optimize herd structure. Based on the system's realities, we adopted a strategy to "decrease sheep population and increase cattle population". Since 2015, the population of mutton sheep in the grassland nomadic system was decreased from 390,000 to 190,000, and that of the beef cattle increased from 40,000 to 81,000. The nomadic husbandry in this system becomes much more well-structured.

Second, Check and identify the grassland grazing capacity and sign letters of responsibility with herdsmen. Based on the overall situation of the natural grassland in the system, we carried out grassland ecological monitoring on an annual basis so as to identify a reasonable grassland grazing capacity for the whole nomadic system. We

timely found out the size of grassland used by each household in summer camps and identified their stocking rate in summer pastures based on the number we set for the whole system. We also signed letters of responsibility with each household to balance the grassland resources and livestock population and limit their livestock grazing time and livestock population in summer pastures.

Third, establish a reward and punishment mechanism, strengthen supervision and inspection, and strictly enforce the law. We established a long-term supervision mechanism for grassland-livestock balance in the nomadic area to closely monitor the grazing activities. We established a mechanism linking the distribution of grassland ecological compensation funds with the implementation of grassland-livestock balance system to make good use of autumn, winter and spring grassland in the nomadic area. We provided preferential subsidies for the construction of facilities like covered pens, silos, forage storage, enclosures and artificial grassland, and technical services for herd structural adjustment and captive breeding. Based on that, we have been strictly implementing *Regulations of Inner Mongolia Autonomous Region on Balancing Grassland and Livestock.*

Finally, enhance publicity and gave full play to herdsmen's initiative. Based on the realities of the nomadic area, we have innovated methods to widely carry out publicity activities by making full use of slogans, leaflets, WeChat and other media. We encourage herdsmen to learn related regulations including *Regulations of Inner Mongolia Autonomous Region on Balancing Grassland and Livestock and Imposing Grazing Prohibition and Deferred Grazing*, *Regulations of Chifeng City on Imposing Grazing Prohibition and Deferred Grazing and Balancing Grassland and Livestock* and *Implementing Measures of Ar Horqin County to Implement Regulations of Chifeng City on Imposing Grazing Prohibition and Deferred Grazing and Balancing Livestock and Grassland(Trail)*. While boosting their confidence in their nomadic culture, we have given full play to the herdsmen's recognition and initiative for balancing the resources and utilizing the grassland.

3.2.4 Propagate nomadic culture

After listed as nationally important agricultural heritage, Ar Horqin grassland nomadic system has been vigorously publicized via all kinds of media which has very good effect.

(1) CCTV documentary shooting

Especially on Aug.21st,2017, large documentary “Purity of Ar Horqin” with six episodes was broadcasted on CCTV “China Nation” program, which fully displayed the purity, magnificent and beauty of Ar Horqin grassland, expressed core concept of grassland culture – “reverence nature, practice opening-up, commit to reputation”, showed the spiritual outlook of Mongolian people – “inherit admonition from the ancient, respect heaven and care people, protect and watch home, harmoniously live together with nature”, and gained unified recognition from farmers, herdsmen and both foreign and domestic experts, greatly improved popularity of Ar Horqin grassland nomadic system.

Fig3.2.8 “Keep Watching”

Fig3.2.9 “Immigration”

Fig3.2.10 “Food”

Fig3.2.11 “Wedding”

Fig3.2.12 “Inner Song”

Fig3.2.13 “Inherit”

(2) Large-scale opera performance

There are three national-level intangible cultural heritages. The "Mongolian Khan Court Music" discovered in 1984 is known as "the living fossil of culture" and successfully restored and inherited, and listed as national-level intangible cultural

heritage in 2014, have already performed for 370 times cumulatively. On Aug.21st,2017, large documentary “Purity of Ar Horqin” with six episodes was broadcasted on CCTV “China Nation” program, which fully displayed the purity, magnificent and beauty of Ar Horqin grassland, expressed core concept of grassland culture – “reverence nature, practice opening-up, commit to reputation”, showed the spiritual outlook of Mongolian people – “inherit admonition from the ancient, respect heaven and care people, protect and watch home, harmoniously live together with nature”, and gained unified recognition from farmers, herdsmen and both foreign and domestic experts, greatly improved popularity of Ar Horqin grassland nomadic system. In June of 2014, nomadic system had been awarded as the second batch of nationally important agricultural cultural heritage. In 2017, the opera “Rhyme of Ar Horqin” created with theme of original nomadic culture had completed arrangement and won silver prize at the seventh Ulan Pasture and Riding art festive, it has already performed 68 times cumulatively.

Fig3.2.14 “Grassland Spirit”

Fig3.2.15 “Heaven and People Integration”

Fig3.2.16 “Health and Happiness”

Fig3.2.17 “Blood Inherit”

(3) Convene Corresponding Conference on Agricultural Cultural Heritage

1)The Fifth Globally Important Agricultural Cultural Heritage (China) Work Exchange Conference

"The Fifth Globally Important Agricultural Cultural Heritage (China) Work Exchange Conference" which is sponsored by the International Cooperation Department of the Ministry of Agriculture and Rural Affairs and undertaken by the People's Government of Ar Horqin Banner, Inner Mongolia Autonomous Region was hold on July.19th in Ar Horqin Banner, Chifeng City. Luo Ming - the deputy director of international communication and service center, Zhao Lijun – the director of international cooperation department of the Ministry of Agriculture an Rural Affairs, Zhao Yingjie – the director of leisure agriculture department of agricultural products processing bureau, Xu Ming - the chairman of international communication and service center, Xiong Zhe – the vice chairman, all presented this conference, professor Luo Shiming – the vice-chairman of the expert committee on globally important agricultural cultural heritage of the Ministry of Agriculture and Rural Affairs, researcher Min Qingwen, Cao Xingshui and other experts, Yu Weidong – the director of Ar Horqin Banner committee of the communist Party of China and other local leaders, responsible leaders from each heritage site, as well as media journalists from "Science and Technology Daily", "Farmer Daily", "China Science Newspaper" and etc, totally 160 people participated in the conference, discussed together protection and development of agricultural cultural heritage in our country.

Fig3.2.18 The Fifth Globally Important Agricultural Cultural Heritage (China) Work Exchange Conference

2)The Fifth National Agricultural Cultural Heritage Academic Seminar

Guided by international cooperation department of Ministry of Agriculture and Rural Affairs and processing bureau of agricultural products, sponsored by agricultural cultural heritage branch of China Agricultural Society and the people's government of Chifeng Ar Horqin Banner, undertaken by Center for Natural and Cultural Heritage Research, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences and Chifeng Ar Horqin Banner grassland nomadic system management committee, jointly undertaken by "World Heritage" magazine, "Heritage and Protection Research" magazine, "China Investment" magazine and China Agricultural Publishing House, "The Fifth National Agricultural Cultural Heritage Academic Seminar" was hold from July.19th to 21st in Ar Horqin Banner, Chifeng City, Inner Mongolia autonomous region. Deputy director Luo Ming, Chairman Xu Ming, Vice-Chairman Xiong Zhe from international communication service center, Vice-Chairman of the Branch Luo Shiming, researcher Cao Xingshui, researcher Min Qingwen and member researcher Zhao Zhijun, researcher Li Xiande, researcher Xu Wangsheng, researcher Yuan Li, domestic corresponding scholars, management personnel of agricultural cultural heritage site, enterprise representatives, media journalists from "Science and Technology Daily", "Farmer Daily", "China Science Newspaper" and etc, totally 160 people participated in the seminar. Banner major Meng Xiaobing and deputy director Luo Ming made a speech subsequently in

opening ceremony, academician Li Wenhua, chairman of the branch, sent a special congratulatory letter.

Fig3.2.19 The Fifth National Agricultural Cultural Heritage Academic Seminar

3) Expert advisory meeting on inner mongolia ar horqin banner nomadic system protection and development

The “Expert Advisory Meeting on Inner Mongolia Ar Horqin Banner Nomadic System Protection and Development” jointly sponsored by the people’s government of Ar Horqin Banner, Chifeng City, Inner Mongolia autonomous region and agricultural cultural heritage branch of China Agricultural Society was hold from July.16th to 18th in Ar Horqin Banner. Professor Luo Shiming – the deputy director member of agricultural cultural heritage branch of China Agricultural Society, researcher Min Qingwen, member researcher Xu Wangsheng, researcher Yuan Li, researcher Zhang Linbo, researcher Li Xiande, professor Hu Ruifa, vice secretary vice researcher Liu Moucheng and other experts, Ar Horqin Banner committee secretary Yu Weidong, banner major Meng Xiaobing, member of the standing committee Siri Gule, vice banner major Pei Huanbin and other local leaders, personnel from corresponding units, media journalists from “Farmer Daily”, “Science and Technology Daily”, “China Science Newspaper” and etc, totally 50 people participated in the meeting.

Fig3.2.20 Expert Advisory Meeting on Inner Mongolia Ar Horqin Banner Nomadic System Protection and Development

3.2.5 Expand industrial space

The committee and government of Banner proposed “Five Base and One Platform” developing target. Surrounding construction of “production, processing and export base of green agricultural and animal products”, making use of pure and pollution-free advantages of the core zone in nomadic area, they constructed natural breeding base of excellent beef cattle and mutton sheep, established traceable system of animal products, fully cultivated landmark brand “Ar Horqin Beef” and “Ar Horqin Mutton”, enriched the characteristic of “natural, green and safe”, created ecological products of grassland nomadic system. Surrounding construction of “leisure resort base of Mongolian nomadic culture characterized tourism”, they introduced powerful enterprises, planned, developed and constructed tourism scientifically and rationally, promoted integration development of primary, secondary and tertiary industries. At present, Dalian Yintai Tourism Group has already entered our Banner, the compile of planning of nomadic area tourism has been completed, the compilation work of Hanshan Natural Reserve is undergoing.

Fig3.2.21 Brand Beef

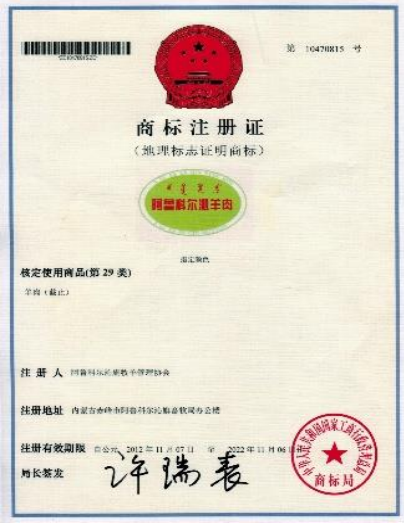

Fig3.2.22 Brand Mutton

Fig3.2.23 Signing Contract with Yintai Tourism Group

3.2.6 Media propaganda

(1) “Recognize Material with Knowledge”, “Fashionable Turntable”, CCTV7

The “Recognize Material with Knowledge” program directly hit the secret of top food material supply chain in and out of China, deepened side reform of agricultural supply, started all-round cross-industry integration with T20 mode, opened the door of market for new type farmer, found products with value for purchasing suppliers, recommended hardly-found top food material for customers. In the fifth episode broadcasted on Dec.3rd, the program recommended big-tailed sheep from “nomadic system from Inner Mongolia Ar Horqin Grassland” and gained millions of orders from famous online retail brands, let audience appreciate the excellent quality of

agricultural products in agricultural cultural heritage, meanwhile inspired farmers in heritage site to step on new road to be new farmers to open up online retail and other market sales channels.

Fig3.2.24 The “Recognize Material with Knowledge” program

(2) Horqin Grassland: A Vivid Textbook of Ecology

On July.20th, “The Fifth Agricultural Cultural Heritage Academic Seminar” was hold in Ar Horqin Banner. As the only left agricultural cultural heritage remained original Mongolian nomadic life and production style, Horqin Grassland gains attention from many experts at agriculture history, ecology, agriculture and husbandry, agricultural economy and ate. From experts’ view, Horqin Grassland is not only a simple grassland for breeding herdsmen and animals, but also a lively sustainable ecological system, the behavior of Horqin Mongolian living close to water contains applicable management of abundant knowledge connotation. Ar Horqin Banner declared China nationally agricultural cultural heritage and was recognized in 2014, became the only nomadic cultural heritage type.

Fig3.2.25 Report on Science and Technology Daily

(3) Grassland Nomadic System: Template of Coordinated Development

There are 15.60 million mu of natural grassland in Ar Horqin Banner, Chifeng, Inner Mongolia, in which more than 5 million mu is the largest-scale original nomadic system which the most completely preserved, it is also the only grassland nomadic system in 91 important agricultural cultural heritages in China. In Expert Advisory Meeting on Inner Mongolia Ar Horqin Banner Nomadic System Protection and Development, the Fifth Globally Important Agricultural Cultural Heritage (China) Work Exchange Conference and the Fifth National Agricultural Cultural Heritage Academic Seminar hold not long ago, local excellent ecological environment, rich grassland culture, abundant animal husbandry products gained a lot of attention from participated experts and representatives. Min Qingwen, the vice-director of Natural and Cultural Heritage Research Center, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Vice-Chairman and Secretary of the Global/Chinese Expert Committee on Important Agricultural Cultural Heritage, Ministry of Agriculture and Rural Affairs, expressed that, agricultural products from

heritage site were ”ecologic agricultural products with cultural connotations”, good connection among heritage sites, entrepreneurs and customers should be created, industrial union should be established to make high-end agricultural products and enter high-end market. Luo Ming, the deputy-director of International Communication Service Center, Ministry of Agriculture and Rural Affairs, thought that it was necessary to highly attach importance to the protection, inherit and utilization work of important agricultural cultural heritages, to make heritage sites as demonstration zones of farm revitalization, experiment zones of ecological cultivation construction and antecedent zones of agricultural green development.


4 综合 LOCAL

草原游牧系统:协调发展的样板

Fig3.2.26 Report on China Science Newspaper

(4) Inherit Nation Characterized Milk Food Culture, Help Get Rid of Poverty and Beat Difficulties – the First Milk Food Culture Festival Hold by Ar Horqin Banner

On Aug.18th and 19th, Saihantala Grassland in Ar Horqin Banner was full of guests and milk flavor. In order to inherit and propagate traditional nation characterized milk food culture, promote development of regional characterized economy, increase farmers’ and herdsmen’s income, help get rid of poverty and beat difficulties, “Frankincense Floating” - the First Milk Food Culture Festival held the grand opening.

In the opening ceremony, each Sumu representative dressed in festival attire stepped into the site accompanied by enthusiastic music, the national flag parade, emblem parade, Chagan Sulide parade, milk food parade and others displayed nation characterized milk food culture, national costume and etc. This milk food culture festival also included milk food production competition, Mongolian wrestling competition, milk food display and other activities, which attracted attention and praise on the nation's culture from lots of people. Wang Dezhi, the director of Ar Horqin Banner Tourism Department expressed that the milk food festival was an important composition of Ar Horqin Banner Rural Tourism Cultural Festival, considered both material and spiritual layers, on one side it added power on propaganda of traditional culture, on the other side it provided energy for income increase of people.


2 特别关注 TEBIEGUANZHU

科学治沙，支撑绿色成长

——内蒙古库布其沙漠治理经验报道之三

传承民族特色奶食文化 助力脱贫攻坚

阿鲁科尔沁旗举办首届奶食文化节

践行大行社会责任 共建和谐美好生活

Fig3.2.27 Report on Inner Mongolia Business Daily

(5) Pure Grassland with Thousand Years of History in Nomadism – Visit of important agricultural cultural heritage, Inner Mongolia Ar Horqin Grassland Nomadic System

Ar Horqin Banner was the traditional region for inhabiting activities of nomadic nation since the ancient time. In June of 2014, Ar Horqin Grassland nomadic system whose core region is Bayanwenduer Grassland had been listed in protection directory of important agricultural cultural heritages in China, who still maintains the pure charm of "live along water and grassland". In recent years, the committee and

government of Ar Horqin Banner attached great importance to the protection and utilization work of grassland nomadic system, especially after it had been listed as globally important agricultural cultural heritage in 2016, in order to enhance protection of nomadic system, the management committee of Ar Horqin Grassland nomadic system and the research institution of Ar Horqin nomadic culture ecological protection had been established, cooperating with science research institutions such as the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, they compiled planning of protection and development, promulgated management methods, actively declared globally important agricultural cultural heritage, made their efforts to protect this pure land. They made full use of advantages of ecology and culture resources, expanded function of grassland nomadism, created development sketch of tourism and multi-function nomadism in the whole region, promoted integration development of nomadism, culture and tourism, which achieved great economic benefits and social influence.


农民日报
FARMERS' DAILY
一颗坚果飘香世界
纯净草原 千年牧歌

Fig3.2.28 Report on Farmer Daily

3.3 Actions Planned to be Taken

Facing these threats and challenges, exploring potentials and seizing opportunities, totally 31 protection actions have been formulated, in all these actions, mining and industrial development are absolutely prohibited. Then, considering the livelihood development of herdsmen, the heritage site will develop related industries based on ecological carrying capacity, including 7 for developing ecological tourism,

5 for ecological protection action, 3 for comprehensive action, 6 for culture heritage action, 4 for developing ecological agricultural products action, and 6 for capacity construction action.

Fig3.3.1 Schematic Actions Planned to be Taken

3.3.1 Comprehensive Actions

(1) Set up Management Center for Ar Horqin Banner Agricultural Cultural Heritage

Main Content: Set up management center for agricultural cultural heritage under agriculture and husbandry bureau, provide with specialized personnel to bear responsibility of protection, development and capacity construction of Ar Horqin Grassland nomadic system.

Implementation Time: From 2018 to 2025

Participants: Committee office of Ar Horqin Banner Institutes and Organizations

(2) Modify Management Methods of Protection and Utilization of Ar Horqin Grassland Nomadic System

Main Content: Modify the existing "Management Methods of Protection of Ar Horqin Grassland Nomadic System", the new management methods should include detailed rules and regulations of management and recovery of grassland, protection of seed quality resource of traditional grass type, subsidy for traditional production methods, scene control of nomadic landscape, dredge of nomadic environment, inherit of traditional nomadic culture, production of ecological nomadic products, development of sustainable tourism, capacity construction, etc.

Implementation Time: From 2018 to 2025

Participants: The people's government of Ar Horqin Banner

(3) Establish Special Fund for Protection and Development of Ar Horqin Grassland Nomadic System

Main Content: Establish special fund for protection and development of heritage, mainly for the support of management and recovery of grassland, protection of seed quality resource of traditional grass type, subsidy for traditional production methods, scene control of nomadic landscape, dredge of nomadic environment, inherit of traditional nomadic culture, production of ecological nomadic products, development of sustainable tourism, capacity construction and etc.

Implementation Time: From 2018 to 2025

Participants: The people's government of Ar Horqin Banner, the bureau of finance of Ar Horqin Banner

3.3.2 Ecological Protection Actions

(1) Establish Subsidy Mechanism for Traditional Livelihood Strategies in Heritage Site

Main Content: Classify herdsmen based on the livelihood strategies they take, subsidy to herdsmen who take traditional livelihood strategy, the methods of subsidy include capital subsidy and non-capital subsidy. Capital subsidy will be completed via special funds set up by the government of heritage site, non-capital subsidy includes establishing targeted policy supporting mechanism, finance load mechanism and etc.
Implementation Time and Location: From 2018 to 2025, in heritage site
Participants: The bureau of finance of Ar Horqin Banner, the bureau of agriculture and husbandry in Ar Horqin Banner

(2) Delimit Nomadic Protected Areas and Base

Main Content: Set up nature reserve at places where nomadic is relatively frequent or scale is large, then introduce fixed work station and research base, set observers, scientific research personnel and government management personnel in station to monitor grassland and warn in advance in a long period.
Implementation Time and Location: From 2018 to 2025, in heritage site
Participants: The bureau of environment protection in Ar Horqin Banner, the bureau of agriculture and husbandry in Ar Horqin Banner

(3) Set up Special Fund for Ecological Projects

Main Content: May establish special fund for protection and development of nomadic and use it as the support for implementation of solutions to nomadic ecological issues, in which research personnel and government personnel with field experience is needed to be relied on to control and invest fund precisely. Thereafter, they should obverse following effect, adjust in time to make theory act on reality then the reality counteract on theory, and then conduct better practice of nomadic ecological issues.

Implementation Time and Location: From 2018 to 2025, in heritage site

Participants: The bureau of finance in Ar Horqin Banner

(4) Perfection Supervision System of Grassland Ecology

Main Content: Use some software to conduct visible monitor, introduce a large batch of scientists and technicians, for example, to carry out information visualization of whole nomadic space through geographic information system, big data and etc, also to directly analyze surface growing characteristic of nomadic grassland with integration with landscape and regional ecology, expanding from scattered nomadic point to the whole region, and to conduct corresponding evaluation and prediction of nomadic ecological safety service.

Implementation Time and Location: From 2018 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner

(5) Secure Sustainable Grassland through Infrastructure Development in Summer-Autumn Region

Main Content: (1) Construction of nomadic roads and infrastructure to promote nomadic in remote grassland and reduce over-grazing of grassland close to road and water source; (2) Prohibition of grazing in severely degenerated grassland; (3) ecological recovery construction of degenerated grassland in wind electricity farm; (4)Coordinate with the management bureau of “Inner Mongolia Gogestai Hanwul National Nature Reserve” to study sustainable using method of buffer zone grassland in national nature reserve.

Implementation Time and Location: From 2019 to 2025, in heritage site (Bayanwenduer Sumu, not including Inner Mongolia Gogestai Hanwul National Nature Reserve)

Participants: The Nomadic Department, the bureau of finance in Ar Horqin Banner; management bureau of Inner Mongolia Gogestai Hanwul National Nature Reserve; Government of Bayanwenduer Sumu

Fund Source: Fund of grassland **c**onservation

3.3.3 Culture Inherit Actions

(1) Build Volunteer Team for Protection and Inherit and Ar Horqin Grassland Nomadic System

Main Content: Build volunteer team mainly compose of students and local herdsmen in heritage site to excavate and manage the culture resource of Ar Horqin nomadic system; encourage traditional knowledge holders to carry out inherit activity and provide supports on sites, timing, funds and other aspects; offer traditional culture courses in Mongolian schools in Banner to invite excellent traditional national culture to school, organize students to research and study in summer camp, to learn and understand traditional Mongolian culture.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The management committee of Ar Horqin nomadic system, the bureau of culture and tourism in Ar Horqin Banner, the government of Bayanwenduer Sumu, corresponding Gacha

Fund Source: Special fund of protection and development of agricultural cultural heritage

(2) Create Electronic Profiles of Traditional Knowledge of Ar Horqin Grassland Nomadic System

Main Content: Record production process and key points of traditional technology by means of documentary, cultivate traditional knowledge successors, especially for those traditional knowledge and technology which have not been included in the protection content of non-material culture heritage. Create profiles for each content, save them by means of words, pictures, sound recordings, videos and etc.

Implementation Time and Location: From 2021 to 2025, in heritage site

Participants: The radio broadcasting station of Ar Horqin Banner, the bureau of culture and tourism in Ar Horqin Banner, the government of Bayanwenduer Sumu

Fund Source: Financial fund, social capital and special fund of protection and development of agricultural cultural heritage

(3) Excavate, Manage and Inherit Mongolian Nomadic Culture, Restore Part of Traditional Folk Customs

Main Content: Excavate and manage traditional culture (including spoken and written language culture, Mongolian dress culture, Nadam Assembly and other folk custom festivals, fairy tales and etc) in heritage site, gradually restore valuable folk custom activities (such as carrying out the production activities of Lele cart and the activities of offering sacrifices to Obo), inherit traditional nomadic culture via holding cultural activities.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, corresponding counties and villages

Fund Source: Special fund of conservation and development of agricultural cultural heritage

(4) Construct Theme Museum of Ar Horqin Grassland Nomadic System Agricultural Cultural Heritage

Main Content: Construct theme museum of Ar Horqin Grassland nomadic system, systematically collect, arrange and display key elements of the system (including traditional construction culture, traditional food culture, fold custom culture, nomadic landscape, corresponding animal resource, plant resource, traditional knowledge and technology system, industrial development situation and etc), make it the first window to display Ar Horqin Banner grassland culture.

Implementation Time and Location: From 2021 to 2025, in the Banner committee of Ar Horqin Banner

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner

Fund Source: Financial fund (special fund)

(5) Compile Science Popularization Reading, Conduct Science Popularization Propaganda

Main Content: Compile science popularization readings of Ar Horqin Grassland nomadic system for different groups, including children, the youth, the majority,

farmers and etc, conduct propaganda on agricultural cultural heritage by means of publication.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, the bureau of culture, tourism and sports in Ar Horqin Banner

Fund Source: Special fund of protection and development of agricultural cultural heritage

(6) Carry out Propaganda Activities of Ar Horqin Grassland Nomadic System Agricultural Cultural Heritage

Main Content: Carry out propaganda activities of nomadic system through publicity brochures, publicity videos, film and television works, photography, essay solicitation, painting, recitation contest and etc; periodically have special report of heritage at local media.

Implementation Time and Location: From 2021 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, the bureau of culture, tourism and sports in Ar Horqin Banner, corresponding departments in Banner committee

Fund Source: Financial fund, social capital and special fund of protection and development of agricultural cultural heritage

3.3.4 Develop Ecological Agricultural Products

(1) Regional Public Brand Building of Heritage Site

Main Content: Collect LOGO design of Inner Mongolia Ar Horqin Grassland nomadic system from the community, and organize relative experts to evaluate and finally confirm the LOGO; formulate using method of the LOGO and let the people's government of Ar Horqin Banner publish the LOGO and issue using and management method.

Implementation Time and Location: From 2019 to 2020, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner

Fund Source: Special fund of protection and development of agricultural cultural heritage

(2) Enlarge "Three Quality and One Standard" Ecological Products Authentication in Heritage Site

Main Content: Improve "Three Quality and One Standard" authentication rate of husbandry products in heritage site and realize full authentication for husbandry products from heritage site. Firstly is to gradually improve authentication standard of husbandry products based on present pollution-free and green authentication, for example for husbandry products which have already achieved green authentication, try to obtain organic authentication; secondly is to promote husbandry products with geographic indication authentication potential to conduct geographic indication product authentication.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner

Fund Source: Special fund of protection and development of agricultural cultural heritage

(3) Promote Deep Processing of Husbandry Products, Extend Industry Chain

Main Content: By fostering agricultural enterprises and cultivating farmer specialized cooperatives, to conduct precise and deep processing of cattle, sheep, donkey and other animals from the heritage site. Classify fresh meat by position and conduct precise and deep process, develop various food processing taking husbandry products as raw materials, develop product processing taking fur of cattle and sheep as raw material, improve additional value of products by extending industrial chain.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The people's government of Ar Horqin Banner, the bureau of agriculture and husbandry in Ar Horqin Banner, the bureau of culture, the government of Bayanwenduer Sumu

Fund Source: Fund of annual financial budget project

(4) Establish Traceability System and Quality Supervision Institute of GIAHS Products

Main Content: Establish whole process traceability system of husbandry products from primary production, first processing, second processing, product circulation to market sales by use of information networking technology. Set up quality supervision management institute of GIAHS products to take responsibility of safety management of product quality.

Implementation Time and Location: From 2019 to 2020, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, market supervision bureau

Fund Source: Special fund of the people's government of Banner

3.3.5 Develop Ecological Tourism

(1) Develop Tourism Resource General Survey and Resource Characteristic Research of Grassland Nomadic System

Main Content: In heritage site, develop tourism resource general survey of relative factor of grassland nomadic system, carding resource classification which can be used to develop tourism, compile database of tourism resource; analyze temporal and spatial distribution characteristics of each kind of tourism resource, evaluate quantity, quality and exploitable value of each kind of resource, compile atlas of tourism resources.

Implementation Time and Location: From 2019 to 2020, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, the bureau of culture, tourism and sports in Ar Horqin Banner, corresponding scientific research institutes

Fund Source: Special fund of protection and development of agricultural cultural heritage

(2) Compile General Planning of Ar Horqin Banner Grassland Nomadic System Ecological Tourism

Main Content: Compile general planning of agricultural cultural heritage ecological tourism within range of Ar Horqin Banner grassland nomadic system heritage site,

determine spatial range of tourism development, general principle of tourism development, types of tourism industry, construction style of tourism facility and path of industrial development.

Implementation Time and Location: From 2019 to 2021, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, the bureau of culture, tourism and sports in Ar Horqin Banner, corresponding scientific research institutes

Fund Source: Annual budget fund of the people's government of Banner

(3) Infrastructure Construction in Ar Horqin Banner Grassland Nomadic System

Main Content: In Ar Horqin Banner grassland nomadic system heritage site – Bayanwenduer Sumu, enhance construction of public transportation lines, communication base stations, medical facilities, water supply and drainage and tourism public service facilities, erect signboards and slogans of agricultural cultural heritage site tourism.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of culture, tourism and sports in Ar Horqin Banner, the government of Bayanwenduer Sumu

Fund Source: Annual budget fund of the people's government of Banner

(4) Develop Planning of Customs Tourism Region of Ar Horqin Banner Grassland Nomadic

Main Content: Depending on the key elements and resource distribution characteristics of agricultural cultural heritage protection, select a certain area of region in heritage site to develop landscape sightseeing, nomadic production and life and corresponding cultural experience tourism. Recruit professional technology team of agricultural cultural heritage to compile planning of grassland nomadic system tourism region.

Implementation Time and Location: From 2019 to 2021, in heritage site

Participants: The bureau of culture, tourism and sports in Ar Horqin Banner, the bureau of agriculture and husbandry in Ar Horqin Banner, the government of Bayanwenduer Sumu

Fund Source: Special budget fund of Banner industry development

(5) Compile Guide Publicity Brochure of Ar Horqin Banner Grassland Nomadic System

Main Content: Taker the majority of people as readers, compile guide publicity brochure of Ar Horqin grassland nomadic system, narrate key elements, cultural connotation of each element, tourist routes and points for attention during tourism in grassland nomadic system.

Implementation Time and Location: From 2019 to 2023, in heritage site

Participants: The bureau of culture, tourism and sports in Ar Horqin Banner, the bureau of agriculture and husbandry in Ar Horqin Banner, the government of Bayanwenduer Sumu, corresponding scientific research institutes

Fund Source: Special fund of protection and development of agricultural cultural heritage

(6) Develop Tourism Products of Nomadic System Agricultural Cultural Heritage

Main Content: Combining with grassland customs tourism regions, husbandry entertainment and other tourism projects, taking key elements of agricultural cultural heritage as content, excavate elements of grassland nomadic production and life in Ar Horqin Banner, Mongolian instruments, palace music, grassland husbandry products and etc, develop tourism souvenirs of agricultural cultural heritage; construct three to five souvenir shops in landscape region and county government location.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of culture, tourism and sports in Ar Horqin Banner, the bureau of agriculture and husbandry in Ar Horqin Banner, corresponding enterprises

Fund Source: Special fund of protection and development of agricultural cultural heritage

(7) Build Information Platform of Grassland Nomadic Tourism

Main Content: Use modern internet technology and develop information platform of grassland nomadic tourism to provide tourists with scene spot introduction in nomadic tourism region, searching and booking of landscape region tickets and hotels, tourism

environment capacity and real time quantity of tourists in landscape region, and real time weather and disaster situation in landscape region, as well as to give suggestions for tourism.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of culture, tourism and sports in Ar Horqin Banner, corresponding scientific research institutes

Fund Source: Special fund of protection and development of agricultural cultural heritage

3.3.6 Capacity Construction

(1) Develop Propaganda and Promotion of Nomadic Cultural System

Main Content: Carding Mongolian nomadic culture and widely propaganda it by means of display boards, broadcast and television programs, culture going to the countryside and etc for improving recognition rate of Mongolian nomadic culture.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of propaganda in Ar Horqin Banner

(2) Set up Expert Lecture System to Improve Capacity of Managing Leaders of Agricultural Cultural Heritage

Main Content: Set up relative expert lecture system to improve capacity of managing leaders of agricultural cultural heritage, periodically and non-periodically recruit agricultural cultural heritage experts in each research direction every year to carry out special lectures of protection and development of Ar Horqin Banner agricultural cultural heritage system, introduce the latest update of protection, utilization and management of agricultural cultural heritage and key issues needs attention, improve recognition level, management and innovation capacity of agricultural cultural heritage of leaders.

Implementation Time and Location: From 2019 to 2021, in heritage site

Participants: The bureau of propaganda in Ar Horqin Banner

(3) Enhance Traditional Agricultural Technology Training of Herdsmen in Heritage Site

Main Content: Hold special training class and research seminar of nomadic business in heritage site periodically and invite professionals in all fields to conduct training on farmers and herdsmen.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, corresponding enterprises, corresponding scientific research institutes

Fund Source: Special fund of protection and development of agricultural cultural heritage

(4) Promote Relative Management Personnel of Heritage Protection and Development to Participate Academic Meeting Exchange

Main Content: Assign managers and representatives of grazing herdsmen to actively participate in national seminar of relative theme to agricultural cultural heritage, positively participate in communication activity with other agricultural cultural heritage sites.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, corresponding enterprises

Fund Source: Special fund of protection and development of agricultural cultural heritage

(5) Conduct Training of Using Modern Information Technology Methods on Herdsmen

Main Content: Combining with national industrial poverty alleviation project and rural areas revitalization project, conduct training of using portable internet software on herdsmen, such as the capacity to on-line sale by means of We-chat, Taobao and other APP.

Implementation Time and Location: From 2019 to 2025, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, corresponding enterprises

Fund Source: Special fund of protection and development of agricultural cultural heritage

(6) Establish Cooperation Research Mechanism with Scientific Research Institutes, Improve Protection and Development Capacity of Heritage Site People

Main Content: Establish stable cooperation relationship with Geographic Science and Resource Research Institute of Chinese Academy of Science, Inner Mongolia Agriculture University, Chinese Academy of Agriculture Science and other scientific research units, such as to set up work stations for academicians, jointly build heritage protection and utilization platform, provide technical supporting for the protection and utilization of Ar Horqin Banner grassland nomadic system.

Implementation Time and Location: From 2019 to 2020, in heritage site

Participants: The bureau of agriculture and husbandry in Ar Horqin Banner, corresponding research institutes

Fund Source: Special fund of protection and development of agricultural cultural heritage

3.4 Guarantee Measures

3.4.1 Establish Institutes for Agricultural Cultural Heritage Protection, Perfect Corresponding System

Additionally set up GIAHS management department in management committee of Ar Horqin Banner grassland nomadic system, assign special positions to take responsibility of management, monitoring, international communication and other relative affairs of GIAHS; based on present “Management Methods of Ar Horqin Banner Grassland Nomadic Region”, formulate “Management Methods of Ar Horqin Grassland Nomadic System Agricultural Cultural Heritage”, combine with protection requirements and monitoring and evaluation methods of GIAHS to specify content of management methods; formulate “Management Methods of Using Ar Horqin Banner Grassland Nomadic System Agricultural Cultural Heritage Signal”, determine authority department, application and approval process, using regulation and monitoring and examination methods of Ar Horqin Banner grassland nomadic system agricultural cultural heritage signals.

3.4.2 Multi-party Participation Mechanism

Agricultural cultural heritage protection is a comprehensive project which needs common effort from government authority departments, enterprises, scientific research institutes, communities, farmers and non-governmental organizations. In order to guarantee effective implementation of agricultural cultural heritage protection action, plan to set up a multi-party participation mechanism with common participation, protection and management from managing institutes of the state, autonomous region, province, banner and county (Fig3.4.1).

At the state level, the Bureau of Agriculture and Rural Affair is continuously perfecting management methods of GIAHS, planning to formulate design and using

management of GIAHS LOGO, and monitoring and evaluation system of GIAHS, set up GIAHS protection and supporting project to promote protection of GIAHS.

Inner Mongolia autonomous region, Chifeng province government and the bureau of agriculture and rural areas strictly implement national corresponding management methods of GIAHS, actively develop declaration and protection work, and give relative fund and policy support for GIAHS declaration and protection work.

The management committee of Ar Horqin Banner grassland nomadic takes overall responsibility of GIAHS protection and development work, including management methods formulation, proposing middle and long term planning, annual work schedule and fund budget of GIAHS protection and development to the people's government of the Banner. The people's government of the Banner then approve relative work schedule, contain GIAHS work to whole work schedule. In accordance with management methods, following planning and work schedule, implement specific protection and development work.

Enterprises are responsible for carrying out product development and market operation of nomadic system in the premise of compliance with GIAHS protection management methods and relative regulations, promote economic development and herdsmen income increase in heritage site, maintain the sustainability of herdsmen livelihood.

Communities in heritage site bear responsibilities to organize and coordinate production and business activities of herdsmen and develop group economy, strive for profits with government and enterprises on behalf of herdsmen, implement GIAHS protection management methods and relative regulations, supervise herdsmen's behaviors.

Non-governmental organizations are responsible for organizing relative research of GIAHS, developing GIAHS knowledge publicity and popularization, conduct husbandry professional skills and modern information technology application training on herdsmen in heritage site, improve their capacity for product development and decision-making.

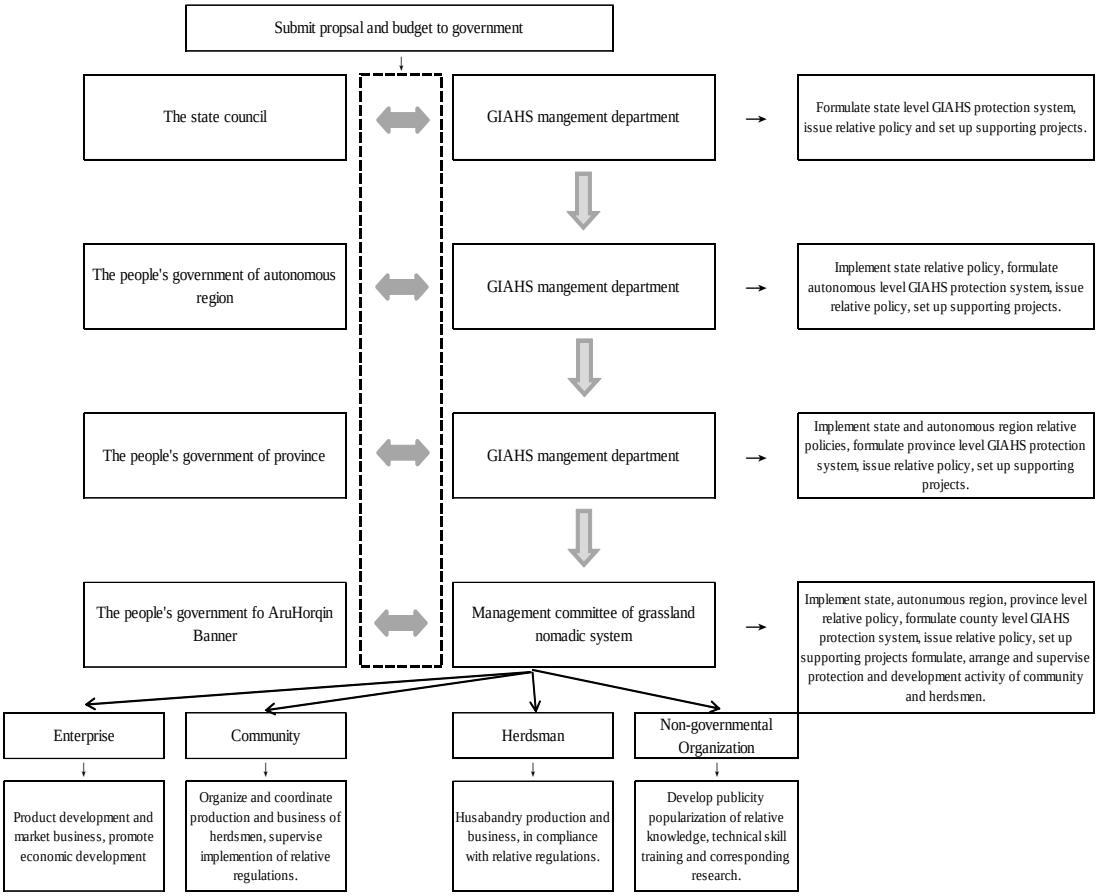

Fig.3.4.1 Multi-party Participation Mechanism for Ar Horqin Grassland Nomadic System Agricultural Cultural Heritage Protection

3.4.3 Fund Support and Guarantee

Strive for fund guarantee of agricultural cultural heritage protection using policy and project support at international, national, local government and each level and attracting private fund (Fig3.4.1). Firstly, establish special fund of protection and development of Ar Horqin agricultural cultural heritage, five million RMB annual budget is treated as fund guarantee for implementation of each protection action plan in Ar Horqin grassland nomadic system. Secondly, strive for relative special financial funds of Inner Mongolia autonomous region level agricultural comprehensive development project, farmers and herdsmen cooperatives development project and etc, use it to support protection and development work of grassland nomadic system. Thirdly, actively apply for national agricultural poverty alleviation project funds and

special farm revitalization agricultural project such as “pilot area of farm primary, secondary and tertiary industry integration development” and “support on breeding base and agricultural products exchange facilities”, use them for protection and industry development of grassland nomadic system. Fourthly, sign supply and marketing cooperation agreement of husbandry products with international organizations and enterprises, strive for support of international funds. Fifthly, cooperate with developed counties and regions to search for their fund support. Besides, make effort to strive for financial support from private enterprises, non-governmental organizations and etc by means of attracting investment, make up supplement to governmental protection funds.

3.4.4 Establish Monitoring and Evaluation Mechanism

In order to guarantee strict implementation of protection action plan and effective protection of grassland nomadic system, according to five selection standards and monitoring and evaluation work proposal of GIAHS launched by the bureau of agriculture and rural Affairs of China in recent past years, monitoring from five parts of the system – livelihood function, agriculture biodiversity and ecological system service function, protection and inherit of traditional knowledge and technology, inherit and development of culture, landscape change, conduct comparative analyse and evaluation on herdsmen on recognition level of GIAHS, self-development capacity, economic behaviour decision-making capacity, make real time tracking records of protection work such as establishment, demonstration, propaganda and publicity of management system, form annual report and survey report, submit to the bureau of agricultural and rural Affairs through GIAHS dynamic monitoring system.

Develop monitoring and evaluation work of Ar Horqin Banner grassland nomadic system at multiple levels:

First level, the nomadic management committee of Banner conducts real time monitoring and evaluation. During implementation period of protection action plan

(2019 to 2025), according to regulations on “Management Methods of Ar Horqin Banner Grassland Nomadic System Agricultural Cultural Heritage”, managers from Ar Horqin Banner grassland nomadic system management committee carry out real time monitor on husbandry and infrastructure construction in heritage sites and economic behaviors of herdsmen, stop their unsuitable behaviors.

Second level, evaluate and summarize on heritage production action plan conducted in this year. During implementation period of protection action plan, at the end of each year, carry out evaluation and summary on the implementation effect of protection action plan in that year, finish self-evaluation report of protection action plan implementation effect, propose modification and suggestion on parts which exist problems and deviation from expected effect and submit to upper management department.

Third level, employ experts at agricultural cultural heritage to conduct mid-term evaluation. At the end of 2022, plan to invite experts at agricultural cultural heritage research with annual special fund established by Ar Horqin Banner nomadic system management committee, by means of purchasing service, to carry out GIAHS monitoring and evaluation, analyze implementation effect of protection action plan, summarize successful methods and point out existing issues and providing solutions.

Fourth level, accept annual monitoring of the bureau of agriculture and rural Affairs and site monitoring and evaluation of experts committee. Carefully complete annual data submission work of dynamic monitoring of GIAHS by the bureau of agriculture and rural Affairs, accept inspection and monitoring evaluation conducted by the bureau of agriculture and rural Affairs, absorb suggestions and opinions from professional committee, optimize protection action plan and implement GIAHS protection action.

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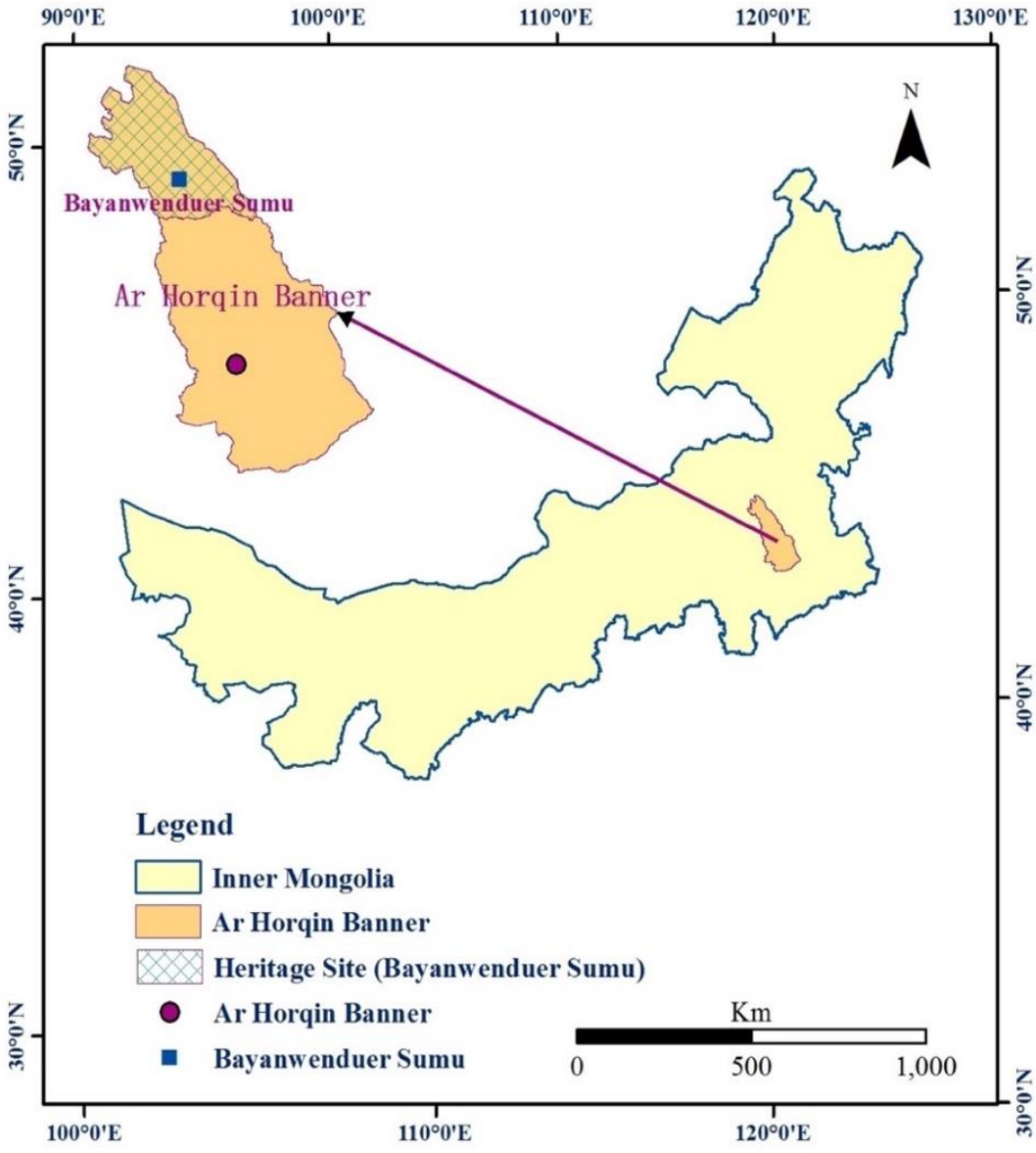
Data sources

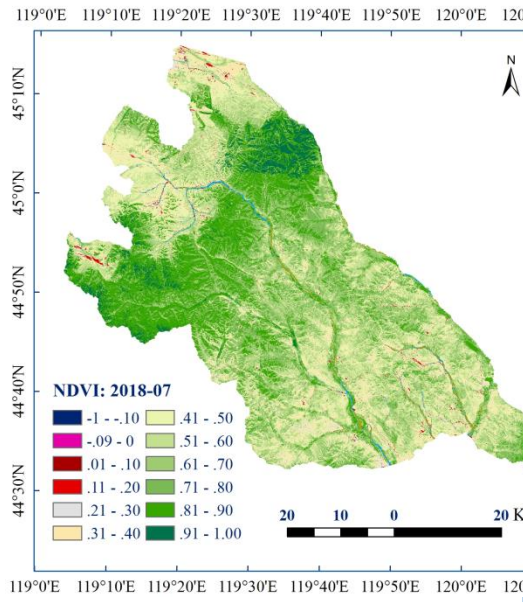
Data type	Data sources
DEM	GDEMV2. http://www.gscloud.cn/sources/?cdataid=302&pdataid=10 (Accessed in August, 2019).
Landscape and land use	Bureau of Natural Resources and Land, Ar Horqin Banner of Inner Mongolia, P. R. China. Land use of Ar Horqin Banner from third national land survey. 2019.
NDVI	Sentinal-2A/2B from Copernicus Open Access Hub. https://scihub.copernicus.eu/dhus/#/home (Accessed in August, 2019) .

Appendix

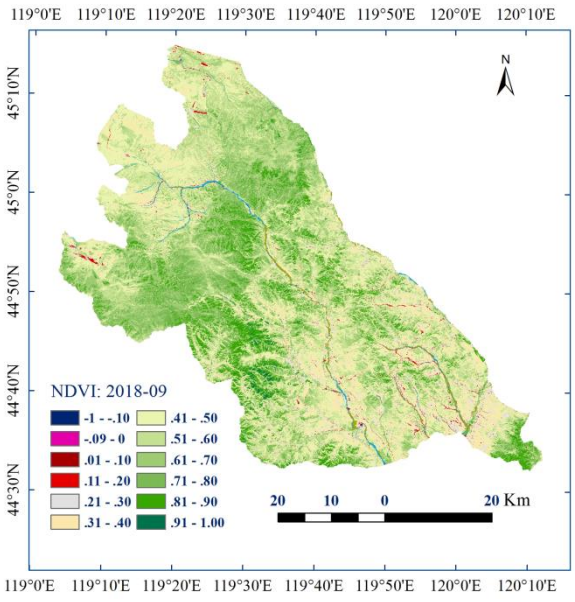
Appendix 1: Pictures of the Proposed GIAHS Site



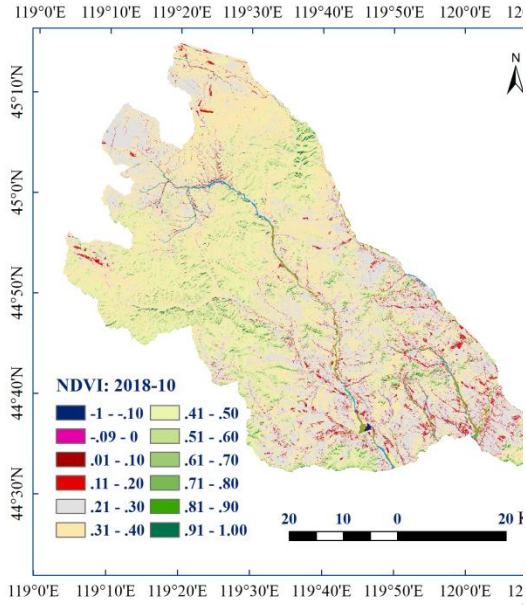
Geographical position map of the heritage site



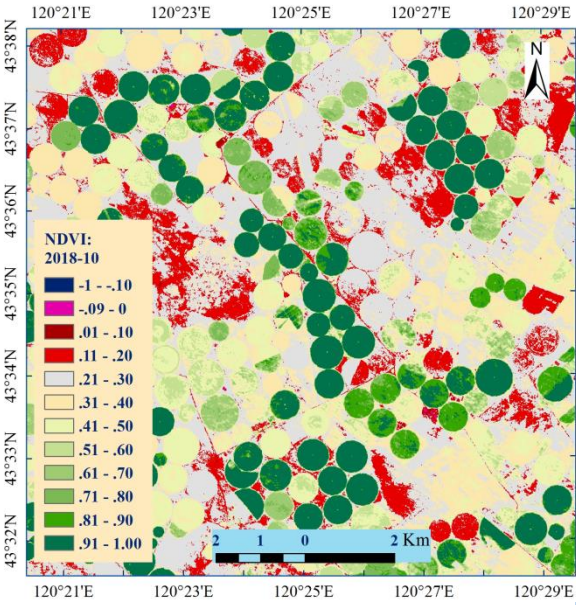
(a) NDVI in July of 2018 in Heritage Site



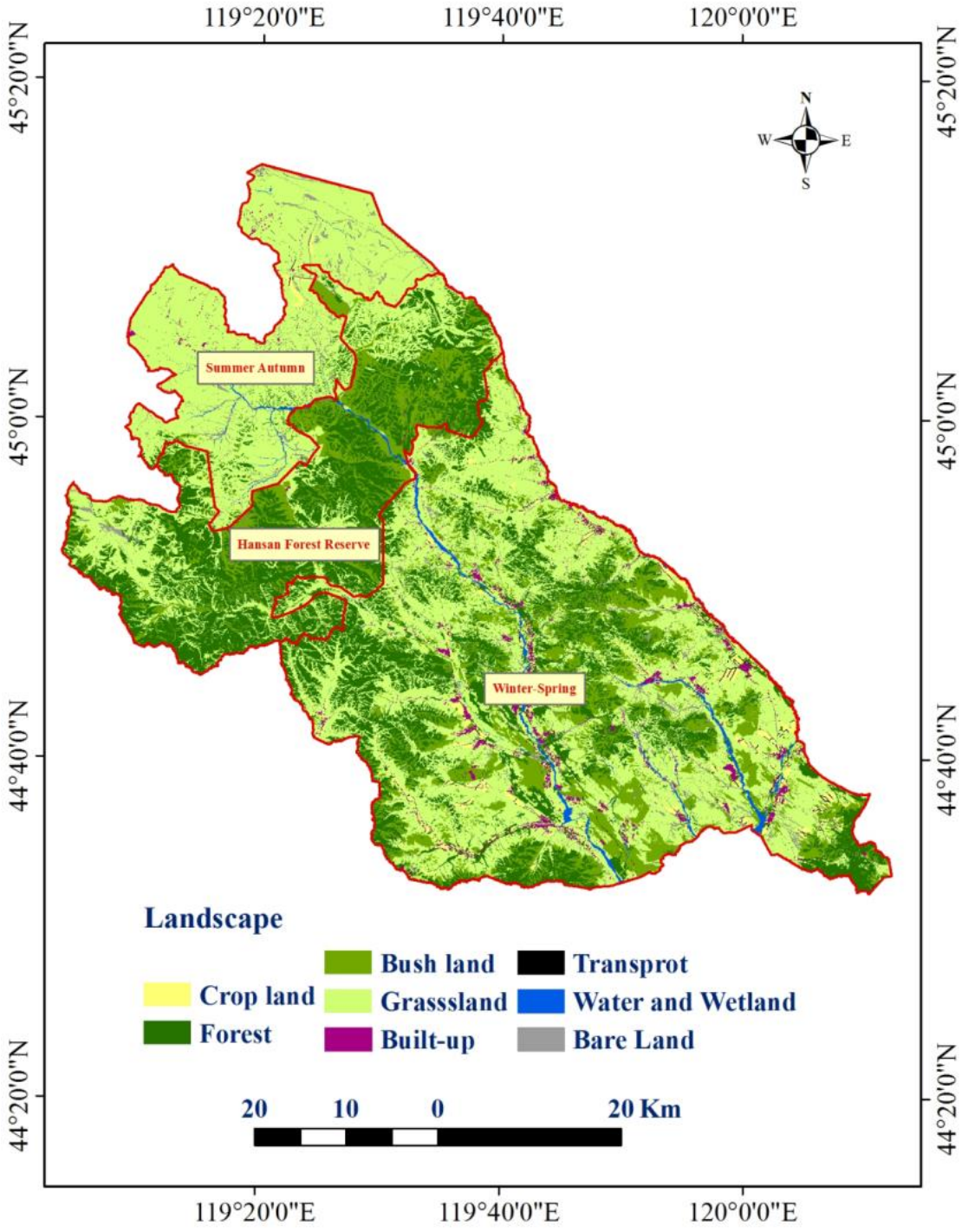
(b) NDVI in September of 2018 in Heritage Site



(c) NDVI in October of 2018 in Heritage Site



(d) NDVI in October of 2018 in Horqin Sand Land Artificial Grassland



Landscape classification map of heritage site

Appendix 2: Biodiversity

Tab. 1 The major botanical species

Family	species
Selaginellaceae	Selaginella sinensis (Desv.) Spring
Equisetaceae	Equisetum pratense Ehrhart
Ephedraceae dumortier	Ephedra sinica Stapf
Salicaceae	Populus simonii Carr.
	Salix matsudana
	Salix gordejevii
	Salix microstachya var. bordensis
Betulaceae	Betula dahurica
	Betula platyphyllacv
Ulmaceae	Ulmus pumila L.
	Ulmus macrocarpa
	Celtis sinensis Pers.
Moraceae	Morus mongolica
	Cannabis sativa L.
Urticaceae	Urtica cannabina
Polygonaceae	Rumex amurensis Fr. Schm. ex Maxim.
	Rumex crispus L.
	Gentianopsis barbata
	Polygonum amphibium
	Polygonum persicaria L.
	Polygonum lapathifolium
	Polygonum divaricatum
	Polygonum alopecuroides
	Fallopia convolvulus
	Fagopyrum tataricum
	Ceratoides arborescens
	Salsola collina
	Kochia scoparia
	Atriplex sibirica L.
	Suaeda glauca
	Suaeda corniculata
	Agriophyllum squarrosum
	Corispermum declinatum var. tylocarpum
	Corispermum candelabrum
	Bassia dasyphylla
	Chenopodium aristatum

Family	species
	Chenopodium glaucum
	Chenopodium acuminatum Willd.
	Chenopodium urbicum subsp. sinicum
	Amaranthus blitoides
	Amaranthus retroflexus var. retroflexus
	Portulaca oleracea
Caryophyllaceae	Arenaria juncea M. Bieb.
	Stellaria dichotoma
	Stellaria dichotoma var. lanceolata
	Silene repens Patr.
	Silene jenisseensis Willd.
	Dianthus chinensis L.
Ranunculaceae	Trollius chinensis
	Delphinium grandiflorum
	Aconitum carmichaelii Debx.
	Anemone silvestris
	Clematis hexapetala
	Clematis brevicaudata
	Clematis aethusifolia Turcz.
	Batrachium trichophyllum
	Halerpestes cymbalaria
	Halerpestes ruthenica (Jacq.) Ovcz.
	Ranunculus japonicus
	Thalictrum petaloideum
	Thalictrum squarrosum
Menispermaceae	Menispermum dauricum
Papaveraceae	Papaver somniferum
Cruciferae	Rorippa globosa (Turcz.) Hayek
	Thlaspi arvense L.
	Lepidium apetalum
	Lepidium latifolium
	Ptilotricum canescens
Crassulaceae	Orostachys fimbriatus
	Sedum aizoon
Saxifragaceae	Parnassia palustris
	Ribes diacanthum Pall.
Rosaceae	Spiraea aquilegifolia Pall.
	Spiraea pubescens
	Sanguisorba officinalis
	Potentilla bifurca
	Potentilla supina L.
	Potentilla longifolia

Family	species
	Potentilla tanacetifolia
	Potentilla anserina L.
	Potentilla multifida
	Potentilla chinensis
	Chamaerhodos erecta
	Camaerhodos canescens Krause
	Cerasus humilis
	Armeniaca sibirica (L.) Lam.
Leguminosae	Sophora flavescens
	Thermopsis lanceolata R.Br.
	Melilotoides ruthenica var. oblongifolia
	Medicago sativa
	Medicago lupulina
	Medicago falcata L.
	Astragalus melilotoides
	Melilotus albus Medic. ex Desr.
	Sphaerophysa salsula
	Caragana microphylla
	Caragana korshinskii
	Caragana intermedia
	Gueldenstaedtia verna subsp. multiflora
	Asfraglus chinensis L.
	Astragalus scaberrimus Bunge
	Astragalus adsurgens Pall.
	Oxytropis racemosa
	Glycyrrhiza uralensis
	Glycyrrhiza pallidiflora
	Hedysarumfruticosum.Pall.
	Lespedeza daurica (Laxm.) Schindl.
	Lespedeza hedysaroide
	Kummerowia stipulacea
	Vicia amoena
	Lathyrus quinquenervius
	Glycine soja
Geraniaceae	Erodium stephanianum
Linaceae	Linum stelleroides
Zygophyllaceae	Tribulus terrester
Rutaceae	Haplophyllum dauricum
Polygalaceae	Polygala tenuifolia
Euphorbiaceae	Speranskia tuberculata
	Flueggea suffruticosa (Pall.) Baill.

Family	species
	Euphorbia esula
	Euphorbia humifusa
Aceraceae	Acer truncatum
Rhamnaceae	Rhamnus ussuriensis
	Rhamnus parvifolia
Vitaceae	Ampelopsis aconitifolia Bunge var. palmiloba (Carr.) Rehd
Malvaceae	Hibiscus trionum
	Malva verticillata
Tamaricaceae	Tamarix chinensis
Violaceae	Viola verecunda
Thymelaeaceae	Diarthron linifolium
	Euphorbia fischeriana
Elaeagnaceae	
Lythraceae	Lythrum salicaria
Trapaceae	Trapa japonica
Onagraceae	Epilobium palustre
Hippuridaceae	Hippuris vulgaris
Umbelliferae	Sphallerocarpus gracilis
	Bupleurum scorzonerifolium
	Cicuta virosa
	Cnidium dahuricum
	Ferula bungeana Kitagawa
	Saposhnikovia divaricata
Primulaceae	Primula farinosa
	Glaux maritima
Plumbaginaceae	Limonium bicolor
Gentianaceae	
	Gentiana dahurica Fisch.
Apocynaceae	Apocynum venetum
Asclepiadaceae	Periploca sepium
	Cynanchum paniculatum
	Cynanchum thesioides
	Cynanchum thesioides var. australe
	Cynanchum chinense
Convolvulaceae	
	Convolvulus arvensis
	Convolvulus ammannii
	Merremia sibirica var. vesiculosa
	Cuscuta chinensis
Boraginaceae	Messerschmidia sibirica
	Stenosolenium saxatile

Family	species
	Cynoglossum divaricatum
	Lappula myosotis V. Wolf
Labiatae	
	Lagopsis supina
	Dracocephalum moldavica
	Leonurus artemisia
	Leonurus sibiricus L.
	Stachys baicalensis
	Thymus mongolicus
	Mentha haplocalyx
Solanaceae	Hyoscyamus niger
	Solanum septemlobum
	Solanum nigrum
	Datura stramonium
Scrophulariaceae	Linaria vulgaris
	Veronica linariifolia
	Veronica anagallis-aquatica
	Odontites serotina
	Pedicularis striata Pall.
	Cymbaria dahurica
Bignoniaceae	Incarvillea sinensis
Orobanchaceae	Orobanche coerulescens
	Orobanche pycnostachya
Lentibulariaceae	Utricularia vulgaris
Plantaginaceae	Plantago depressa
	Plantago asiatica L.
Rubiaceae	Galium verum
	Rubia cordifolia
Valerianaceae	Patrinia rupestris
Campanulaceae	Adenophora tricuspidata
	Adenophora tetraphylla (Thunb.) Fisch.
Compositae	Polycarpaea corymbosa
	Kalimeris integrifolia
	Heteropappus altaicus
	Turczaninowia fastigiata
	Tripolium vulgare
	Leontopodium leontopodioides
	Anaphalis hancockii
	Inula salicina
	Inula britanica
	Inula salsoloides

Family	species
	Xanthium sibiricum
	Bidens cernua
	Bidens parviflora
	Filifolium sibiricum (L.) Kitam.
	Artemisia sieversiana
	Artemisia anethifolia
	Artemisia frigida
	Artemisia annua
	Artemisia rupestris
	Artemisia mongolica
	Artemisia atrovirens Hand.-Mazz.
	Artemisia desertorum
	Artemisia pubescens
	Artemisia scoparia Waldst. et Kit.
	Tephroseris kirilowii
	Senecio argunensis
	Echinops gmelini
	Echinops latifolius
	Atractylodes lancea
	Saussurea amara
	Saussurea japonica
	Olgaea leucophylla
	Cirsium setosum
	Cirsium setosum (Willd.) MB.
	Serratula centauroides
	Stemmacantha uniflora
	Gerbera anandria
	Equisetum ramosissimum subsp. debile
	Scorzonera sinensis
	Scorzonera austriaca
	Picris hieracioides
	Taraxacum mongolicum
	Taraxacum borealisinense
	Taraxacum asiaticum
	Sonchus oleraceus
	Lagedium sibiricum
	Youngia stenoma
	Ixeridium chinense (Thunb.) Tzvel.
	Ixeris polycephala
Typhaceae	Typha latifolia
	Typha minima
	Typha angustifolia

Family	species
Sparganiaceae	Sparganium stoloniferum
Potamogetonaceae	
	Potamogeton perfoliatus
Juncaginaceae	Triglochin maritimum
	Triglochin palustre
Alismataceae	
	Typhonium divaricatum (L.) Decne.
Butomaceae	Butomus umbellatus
Gramineae	
	Phragmites australis
	Aristida adscensionis
	Glyceria maxima
	Poa pratensis
	Puccinellia tenuiflora
	Agropyron cristatum
	Elymus dahuricus
	Leymus chinensis
	Leymus secalinus
	Calamagrostis epigeios
	Calamagrostis pseudophragmites
	Agrostis divaricatissima
	Stipa grandis P. Smirn.
	Achnatherum splendens
	Trib. Pappophoreae
	Eragrostis pilosa
	Eragrostis cilianensis
	Eragrostis minor
	Cleistogenes squarrosa
	Cleistogenes chinensis
	Cleistogenes polyphylla
	Chloris virgata
	Crypsis aculeata (L.) Ait.
	Tragus racemosus (L.) All.
	Arundinella anomala
	Panicum miliaceum L.
	Echinochloa crusgalli
	Echinochloa caudata
	Digitaria ischaemum
	Setaria viridis
	Setaria glauca
	Setaria arenaria Kitag.
	Hemarthria altissima

Family	species
	Arthraxon hispidus
Cyperaceae	Sclrpus cernuus
	Scirpus validus
Araceae	Acorus calamus
Pontederiaceae	Monochoria korsakowii
Juncaceae	
Liliaceae	Veratrum nigrum
	Anemarrhena asphodeloides
	Lilium pumilum
	Allium neriniflorum
	Allium ramosum
	Allium anisopodium
	Allium polyrhizum
	Allium senescens
	Allium chrysanthum
	Polygonatum sibiricum
	Asparagus dauricus
Iridaceae	Iris tenuifolia
	Iris lactea var. chinensis
Orchidaceae	Spiranthes sinensis

Tab.2 Key protected animals in the system

Protection category	Species
Threatened species in the world	Anser cygnoides, Grus japonensis, Grus vipio Pallas, Otis tarda Linnaeus, Larus saundersi, Larus relictus, Bubo coromandus,Aythya baeri
First-class protected birds	Grus japonensis, Otis tarda Linnaeus, Larus relictus
Secondary class national-protected birds	Aegypius monachus, Falco Subbuteo, Falco tinnunculus, Buteo hemilasius, Aquila nipalensis, Circus cyaneus, Haliaeetus leucogaster, Accipiter virgatus, Cygnus Cygnus, Cygnus columbianus, Aix galericulata, Anthropoides virgo, Grus grus, Grus vipio, Bubo buboAsio otus, Black Grouse
CITES	Anas acuta, Anas clypeata, Anas crecca, Anas querquedula, Aythya nyroca, Grus japonensis, Grus vipio, Larus relictus
National second-level protection of mammals	Cervus elaphus, Lynx lynx