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Inheriting and advancing the essence of nomadic culture , and searching for a new course of harmonious development on the grassland

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Key points :

- 1 . The grassland in the northern China is the cradle of nomadic ethical culture , which facilitates to renew the grassland naturally and protects the biodiversity and natural environment .
- 2 . The essence of nomadic civilization is to observe natural laws and the harmonious coexistence of human being with the nature .
- 3 . We should use the essence of nomadic civilization as reference and take some efficient methods to support the sustainable and harmonious development on grassland .

Keywords : grassland , sustainable development , nomadic civilization , biodiversity

The grassland in the north of China , the eastern flank of the grassland of the Euro-Asian continent , covers three temperate zones : semi-moist , semiarid and arid . From the Nenjiang-West Liaohe Plain in the east , via the southern and northern sides of Yinshan Mountain , to Helan Mountain in the west , types of grassland and landscape vary greatly with the decrease of atmosphere humidity and the increase of heat . This difference results in different steppe zones forming and also each zone has its unique features in utility structure , history and culture . So , the grassland is not only the origin of nomadic people , but also performs the irreplaceable function of eco-protection .

Grassland on the north of China being cradle of ethical culture

Nenjiang-West Liaohe plain and Ke erqin region The meadow steppe is distributed from Ke erqin steppe on the Nenjiang-West Liaohe plain to the mountain-front area in the western piedmont of the Daxing anling Mountain . On this region , the humidity is 0.40-0.60 . The zonal vegetation is meadow steppe dominated by *Stipa baicalensis* and the zonal soil is chernozem . The *Leymus chinensis* grassland with other herbaceous plants inhabit the lower part and piedmont of hills , while in valley , the wet meadow and swamp distribute along the rivers . The Ke erqin sandy area in the west Liaohe drainage area is formed by windy accumulation on the alluvial plain since the Quaternary Period .

People from the Neolithic Age to the Bronze Age began primitive fishing , hunting , husbandry and farming . By periods of Liao and Jin in the Middle Ages , there had been the structure of mutual existence of farming and livestock husbandry . In many times of northward migration due to social unrest in Ming and Qing dynasties , there was merging of ethnic cultures . But in the latter half of the 20th century , with the development of economy and the increase of population , there has been overuse of grassland and water resources , resulting in a sharp decrease of water amount in west Liaohe River , degeneration of plantation , alkalization of *Leymus chinensis* grassland , and the expansion of desertification . At present , with the development of economy , there has formed a multiple structure of planting and livestock raised , and the management pattern of preliminary industrialization .

Inner Mongolia Plateau From the Hulunbeier to the northern piedmont of Yinshan mountain (110°—120° E) , from east to west , the typical steppe and desert steppe are distributed , which are adapted to semiarid climat , dominated by *Stipa grandis* , *Stipa krylovii* , *Stipa breviflora* and *Stipa klemenzi* . The soil is castanozem . On the syncline structure between Abaga lava platform and Yinshan Mountain , there is the Hunshandake sandy land formed during the Quaternary Period . The east is located by *Picea* wood scarce sandy grassland , the middle part is the combination of *Ulmus* wood scarce sandy grassland and bushy grassland , while the west is mainly dominated by *Caragana* and *Artemisia intramongolica* bushy grassland .

The typical grassland belt is the grazing area where the northern ethical people have been operating animal husbandry , and is the main origin of nomadic culture . As early as in the fifth and sixth centuries , archaic tribe of Mengwushiwei people and Wuluohou people began to shift from fishing and hunting to animal husbandry . In the 7th century , ancestors of Mongolians migrated from Daxing anling Mountain to the vast grassland . Then in the 9th century , Mongolians , in the process of communication with Turks and Huihes , gathered experiences of animal husbandry and social life on the grassland and carried on the development of nomadic civilization (Hao , 2006) . In the tough climatic environment on the grassland , they have developed the livestock which are suitable for extensive feeding , created seasonal grazing pattern for different grassland types , and formed a conception of keeping ecological balance by migrating to wherever there is water and grass , which may preserve the balance of the ecosystem , and have formed a pattern of sustainable production . They depend on the grassland and the domestic animals to satisfy their material needs in life . However , over 40 years overgrazing most of the typical steppe region has been degenerated dominated by *Artemisia frigida* and *Cleistogenes squarrosa* (Liu et al . , 1998 ; Wang et al . , 1996) .

Ordos Plateau The humidity is 0.20-0.45 on this region. The zonal vegetation is warm-temperate steppe dominated by *Stipa bungeana*, *Stipa breviflora*, and *Stipa glareosa*. On conglomerate hilly slopes, *Artemisia sacrorum* and *Artemisia giraldii* form steppe variants; while on Kubuqi-Maowusu sandy land and hilly slopes, there are bushes like *Caragana davazamcii*, *Hippophae rhamnoides* and *Rosa xanhin*. Grassland belt on the south of Yinshan Mountain is a complicated area with natural and humanistic variety, and various ecological and geographical structures, and it is also an area where farming industry and husbandry industry converge. Many nations live together in this region, because of the alternating development of farming and grazing, nomadic cultural development on the grassland has been stamped deeply with farming culture (Ren, 1997). Till 20th century, because of rapid population increase, agricultural cultivation and expansion of husbandry, the degeneration of vegetation and desertification of land were very common, which cause the serious damage of ecological function.

To summarize, northern ethnic people living here have developed nomadic style suitable to the environment and resources. The numbers of people and domestic livestock then did not pose strong and persistent pressure on the grassland. The grassland, as the natural resources for husbandry, still has surplus in renewable forage grass, water source and sufficient physical space. So, ensuring the physical balance of the grassland ecosystem can effectively play the role of the grassland in ecological protection. Therefore, the essence of nomadic civilization is to observe natural laws and the harmonious coexistence of human being with the nature.

Obtaining enlightenment from the essence of nomadic culture on the grassland On the Mongolian Plateau, herders' nomadic life has lasted a long time, which is the creation of northern nations, including Mongolian. There is profound ecological consciousness, and is historically reasonable and necessary to a high degree in the nomadic culture. It is not hard for us to find out a close connection between the national cultural heritage and present view of sustainable development. Therefore, it is highly enlightening to us in our attempt to follow the pattern of scientific development, search for new model of economic development in the pastoral area, and for the new course of industrialized husbandry. We will try to make tentative exploration in evaluating the historical importance of Mongolian nomadic life, comprehensively understanding the ecological function of the grassland, preserving the biological diversity on the grassland, developing varieties of domestic animals, setting up the ecologically civilization idea of harmonious development between human beings and the nature, and realizing the objectives of regional harmonious development and national prosperity.

Ensuring the productivity and biodiversity of grassland Nomadic style can ensure the reproductive power of the grassland, and preserve the natural evolution of biological diversity and the relative stability of valuable genetic resources. It keeps the grassland in an ecological climax which is close to the natural climatic under the condition of cycled grazing. The grassland is a natural ecosystem with reproductive mechanism, composed of various green plant species and other biodiversity elements, and complex non-biological environmental factors, and also the product of historical evolution. In the nomadic life of migrating to wherever there is water and grass, there is a balanced ratio of domestic animals' grazing, which cannot seriously interfere with the self-sustained climax. Therefore, the self-renewal and self-regulation mechanism of the system will not be broken, and the green plant species and other biological species occupy their own positions in the system to be reproductive, keeping a harmonious self-organized biological process in species communities (Hao and Liu, 2002). These green plant communities form nutrition sources and good nutrition combination for domestic animals. So, Mongolian herders have depended on naturally gifted grassland ecological system, created nomadic living style suitable to historical conditions.

Domesticating local livestock variety Nomadic production trains domestic animals' ecological endurance, suitable for cold, arid, variable and misfortune-plagued climatic environment, and extensive grazing management manner. In the coevolution process of grassland ecosystem, local livestock with high endurance has been chosen, and domestic animals' best productive capacity and high-quality animal products have been developed to suit for the tough environment and extensive grazing style. After long-term raising, domestic animals on the northern grassland have become indispensable members in the grassland ecosystem. The Hulunbeier Grassland where the weather is very cold in winter, a steppe with various and high grass formed under the semimoiest and semiarid condition, becomes the origin of "Sanhe oxen" and "Sanhe horses". From Hulunbeier to Wuzhumuqin grassland, the Wuzhumuqin fat-tail sheep, an excellent local variety, is raised during long nomadic time on typical steppe. Sunite sheep is another good local variety adapted to the arid desert steppe dominated by *Stipa klemenzii* and *Stipa breviflora*.

Building an optimized resource-used system Nomadic life has built up a combined ecological-economic-social system composed of air (climatic environment), ground (soil nutrition reserve), life (biodiversity) and human beings (human society). The system is an optimized combination of energy flow and material cycling. Domestic livestock grazed on the grassland have thoroughly built up the basic physical foundation for clothes, diet, shelter and traffic of Mongolians and other ethnic people. Meat and milk from cattle and sheep have provided most of products for food. Wool and leather are the important material for making clothes and living (yurt). Cattle, horse and camel are the power sources for labor and military use. Feces are used for fuel. To summarize, domestic livestock are the important part of total biological energy in the living and development on the grassland. In nomadic life, the grassland and domestic livestock are the physical foundation for many national existence and prosperity. The vast grassland and diet structure with priority on meat and milk have built people's strong body that are suitable for long journey, hardship endurance, and excelling at riding (Enkhee, 2002).

Above all, in nomadic life, people love and protect the grassland and domestic livestock. Such feeling and idea is the valuable ecological consciousness for human's harmonious existence with nature, and the good mental basis for sustainable development. Nature is also the source of civilization development for nations on the grassland. The vast grassland scenery has shaped mighty and straightforward art style, special character and developed the spirit of mutual caring and admiration for nature.

Inheriting the essence of nomadic culture and searching for sustainable development on grassland In the latter half of the 20th century, with the development of economy, the increase of population and the change of grazing system after people settling, there has been overgrazing of grassland and over using water resources, resulting in many ecological and environmental issues, including degeneration, alkalization, and desertification of grassland. Though ancient nomadic style is no longer the national needs in the new times, the ecological awareness and the essence of nomadic culture in our ethical heritage are still the useful and powerful references which we can draw in our effort keep sustainable development in the grassland area.

To protect biodiversity and use resources reasonably The biodiversity is the physical foundation for people existence and prosperity in grassland regions. In pastoral areas, there are plant resources and high-quality domestic livestock variety resources. To protect biodiversity means to protect precious renewable resources, and also means to protect local herders. Of course, the grassland not only has unique farming and husbandry resources, but also has environment, customs, and multiple energy advantages, such as metal and non-metal mineral resources, coal, oil, natural gas, wind energy, solar energy and biomass energy. With the development of industry, we should use the resources reasonably, and protect the local biodiversity.

To preserve the mechanism of grassland renewing, and perform a practice of grazing suspension-rotational grazing system Because the semiarid grassland is limited in climatic variation, intense evaporation, severe coldness in winter and water and heat resources, it is necessary to accurately calculate the productivity of natural grassland, variation between seasons and variable ratio between years. In order to protect the renewal mechanism of the grassland, it is necessary that grazing amount and harvest amount not exceed the threshold value of the biological reproductive power on the grassland. It is necessary to practice rotational grazing system. Meanwhile, annual prohibition period has to be set up so as to provide a favorable condition for grass to renew and to keep the productivity and healthy ecological system on the grassland.

To fence degenerated grassland to facilitate its growth On the degenerated grassland, due to the poor quality of grass communities, its productivity has been distinctively reduced. So it has to be closed for about 7 to 8 years, according to our experiment results, so that its grass community structure and productivity can be generally restored (Wang et al., 1996). Closing down the degenerated grassland can eliminate the negative effects of stamping and grazing of domestic animals. Various plants in the communities compete with each other and exert intro-species and inter-species effects, leading some degenerated species such as *Artemisia frigida*, *Potentilla acaulis* to evolve into communities adapted to local climatic conditions, such as *Stipa* or *Leymus chinensis*. In the recovery process of the degenerated grassland ecosystem, some high-quality forage grass such as *Leymus chinensis*, *Stipa grandis*, *Agropyron michnoi*, *Koeleria cristata*, *Achnatherum sibiricum* and *Allium senascens* will gradually increase. *Agropyron michnoi* can noticeably increase in the fifth year. *Leymus chinensis* can noticeably increase in the eighth year and turn to the dominating breed in the community, while some unusable or low-quality forage grass species, such as *Artemisia frigida*, *Artemisia pubescens*, *Cleistogenes squarros*, *Potentilla acaulis* and *Heteropappus altaicus*, gradually change from dominating ones into accompanying ones in the communities (Wang et al., 1997, 1999).

When fenced, in order to ensure the live of the herders, an important measure in constructing grassland eco-environment and intensively managing grassland husbandry is to use valley beach land, low-lying area in lake basin, depression among dunes, where there is relatively high level of underwater (accounting for about 5-6% of total area of the grassland area), to set up various kinds of artificial non-irrigation and modest refilling irrigation grassland and forage areas (Chen, 1998).

To found new farming and husbandry system on the grassland For the primary policy of constructing ecological safety belt on the northern grassland, the government has adopted a policy in pastoral areas to support the practice of "converting grazing into grass rearing land", and has developed multiple management pattern for the sustainable growth in pastoral areas (Ren, 2001). At present, administrations of various levels and the masses have taken actions and have set up applicable or tentative methods to protect and construct the grassland, and are exploring sustainable husbandry management. At present, grazing suspension and alternating grazing are promoted to utilize and protect the grassland reasonably. In suitable areas, various types of artificial grasslands and forage bases can be set up. Based on intensive management pattern, there can be grazing in summer while rearing in winter, so the pastoral areas can be converted into reproduction bases. In farming-husbandry interlacing area south and east of the pastoral area, there are resources and environments for both farming and husbandry, so there is a favorable condition for integrating farming and rearing and for cultivating domestic animals. In grazing-farming interlacing area, advantages from both sides can complement each other, and there can be system coupling. New intensive and industrialized farming and husbandry production system can be development. New grassland industry regions can be established by making overall plans about urban and rural economical and social development objectives (Ren, 1997).

To establish an incentive mechanism favorable to grassland and ethical cultural protection In pasture area, under the guidance of

national laws and regulations , detailed rules applicable to local pasture conditions about grassland protection , construction and utilization should be set up in every banner and county . For grassland used by herders , use intensity should be regulated ; preserving objectives should be set up so that both the right to use the grassland and the obligation to preserve the environment of the grassland can be decided . At the same time , grassland ecological environment should be monitored by scientists or a joint effort with herders so that scientific evidence can be provided for legal management .

Herders protect the grassland not only for their own better production and living condition , but also for public good purposes , for the environmental improvement of neighborhood area . For herders who close their own pastureland for grazing suspension and achieve favorable effects , some material rewarding can be offered to compensate for decreased economic benefits due to fewer heads of livestock . Grassland plantation recovery and construction projects can be undertaken by herders in cooperation of companies . If certain standards are met , rewards can be paid . In order to prevent overgrazing , some regulations can be established to levy higher taxes to overgrazed livestock .

With reference to principles and objectives of " biosphere reserve " , " natural legacy reserve " and " cultural legacy reserve " , proposed by some related international organizations of the United Nations , some " grassland natural-economic-cultural reserves " should be set up that are adapted to requirements of sustainable development .

Above all , we should inherit and advance the essence of nomadic culture and optimize our system about investing in ecological construction , rely on science and technology and closely observe natural and economic rules . In grassland area , we should practice a pattern of grazing suspension and alternation , grassland construction , grazing in summer and rearing in winter , rearing in lands , investment increase , intensive management , optimized administration , safety ensuring , opening-up system and interactive development . In a comprehensive development of industrialization , urbanization and industrialization of farming and husbandry , we shall comprehensively construct a well-off society and realize the objectives of ecological safety and farmers and herders ' good live on grassland .

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