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Water resources development and utilization in the pastoral area of China and grassland ecological protection

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Ladies and gentlemen ,

It is my pleasure to attend this China Forum at the invitation of committee of Joint Meeting of the International Grassland Congress and the International Rangeland Congress to discuss the situation of water resources in pastoral area and grassland ecological protection issues and share our experiences with the experts and scholars .

China is a big grassland country in the world .Meanwhile it is also one of the most arid grasslands in the world .To study the Chinese grassland ecological protection ,especially the water resources guarantee of the protection not only has direct guiding significance to it but also has important reference value to other relevant countries .

Now I would briefly introduce ,from the perspective of water conservancy ,the basic condition and problems in the pastoral area of China ,influence of water conservancy construction to grassland ecological protection ,basic approach and main mode of developing water conservancy to protect grassland ecology as well as the water conservancy actions on future grassland ecological protection in China .

The basic condition and problems in the pastoral area of China

The pastoral area in China mainly distributes in over 400 counties and leagues in 14 provinces and the autonomous regions such as Inner Mongolia and Xinjiang and so on .It covers a total area of 4.42 million km^2 ,in which the grassland area is about 270 million hm^2 and the utilizable grassland is 230 million hm^2 .The total population in the pastoral area is 50 million ,of which the livestock-raising population is 10 million .

In China ,most of the pastoral area is in drought or semi-drought regions with rare rainfall and strong evaporation .So the water resources are not enough ,the wind and sandstorms are frequent and the ecology is fragile .Among the utilizable grassland of 230 million hm^2 ,the annual rainfall in 120 million hm^2 grassland is 200 to 400 mm and that in 40 million hm^2 grassland is below 200mm .

The above-mentioned two conditions determine that the basic problem in the pastoral area is the contradiction between production development and ecological protection .On one hand ,with the increasing of herdsmen population and improvement of living standard ,the production such as livestock husbandry require constant development ; on the other hand ,due to the climate change and the influence of human activities ,degradation of different degrees have occurred on grassland and the stocking capacity has obviously decreased ,which poses a threat to the regional ecological security .Therefore ,to study the solution to the protection and development of the pastoral area in China must have new approach and methods .We should restrain the constant deterioration of grasslands and improve the production condition and living environment of herders .The government should develop technologies and promote applicable production modes to meet the requirements of production development ,so as to reduce human beings' Exploitation and Plundering ?? on grassland resources and realize the win-win objective of ecological improvement and production development .In the process of pursuing the objective ,water conservancy has irreplaceable function .

Influence of water conservancy construction in the Pastoral area to grassland ecological protection and restoration

Most of the pastoral areas in China are located at the main river source area and they are also important ecological barriers of China ,so protecting the grassland ecology in the pastoral areas has great significance to the sustainable development of the whole economic society and the sustainable utilization of water resources .The reason why water conservancy is helpful to solve the existing problems in the grassland pastoral area is that developing the water conservancy focusing on irrigation forage lands can greatly improve the grass output of unit area and reduce the excessively dependence of livestock on natural grasslands .In this way ,not only the forage requirement of livestock is guaranteed but also partial natural grasslands can rest grazing .In the last 20 years ,centering on how to improve the carrying capacity of the grasslands to provide basic guarantee for economic development and grassland ecological protection by water conservancy measures ,the governments at all levels ,relevant departments and units have constantly explored and summed up relevant solutions .In view of serious contradiction between grass and livestock and the severe situation of constant deterioration of grassland ecology ,the Chinese government started water conservancy pilot project construction since 2001 .In the pastoral area with water resources condition of Inner Mongolia ,Xinjiang ,Gansu and so forth ,the government has developed the water conservancy construction focusing on water-saving irrigation forage lands to solve the forage supply problem of livestock and conducted fenced rotational grazing ,spelling and banning grazing on large-area natural grasslands with the combination of measures such as stall-feeding and semi-stall feeding .The pilot project not only plays the function of "building small oasis to protect big ecology" ,but also has effectively improved the anti-disaster capability of animal husbandry ,increased the income of herders and improved their living conditions .According to the experiences in pilot project districts ,the grass output on 1 hm^2 of irrigated forage approximately equals that on 40 hm^2 of medium drought grassland .It not only effectively protects the natural grasslands but also the annual per capita income in the

Project district is RMB 2,000 more than that in the non-project district. By the end of 2007, the whole country had built about 1.07 million hm^2 irrigated forage lands, which has supplied forage for more than 21 million sheep and provided basic support for the ecological protection of 40 million hm^2 of natural grasslands. Practice proves that the water conservancy constructions in the pastoral area is favorable to grassland ecological protection and regional ecology maintenance, and is beneficial to economic development of the pastoral area and the income increasing of herders. Moreover, it can find the combination point of them in certain extent to realize win-win.

Basic approach and main mode to develop water resources in the Pastoral area to protect grassland ecology

A Basic Approach. Years of practices has developed the approach on developing the water conservancy to restore grassland ecology which can be summarized into the following three points: 1) we must fully exert the self-restoration capability of nature. By taking measures on the precondition of stable production, withdraw over-stocked livestock from natural grasslands and migrate people and livestock out of severe degraded grassland to allow the natural rehabilitation takes place. This is the key to protect and improve grassland ecology. 2) to realize the "double win" objective of economic development and ecological protection must change the traditional production and management mode of animal husbandry, so that the grazing capacity can be reasonably controlled. 3) to develop the water conservancy with irrigation forage lands as the main content can greatly improve the unit grass output and quality. It is the precondition and basic guarantee to change production and management mode of animal husbandry and exert the self-restoration capability of nature.

B Main Patterns. There are mainly three patterns about water conservancy construction in the pastoral area. First, to equip and improve current irrigation facilities for partially irrigated forage land which has severe water waste problem through increasing investment, introducing advanced technologies etc. Secondly, build new water-saving irrigated forage land. To construct water saving irrigation facilities in areas which has feasible accesses to water resources, and develop various high-efficiency water saving irrigated forage lands. There are three main types of land according to local conditions: family irrigated forage lands, multi-families irrigated forage lands and irrigated forage base. Thirdly, adjust the existing plantation structure to increase the area of irrigated forage lands. Part of the cropping land could be equipped with irrigation facilities and be developed into high-efficient water saving irrigated forage land, through which animal husbandry could be enhanced and bigger scale of ecological protection is achievable.

Water conservancy actions on future grassland ecological protection in China

The water conservancy construction in China is undergoing reform. In this reform, more attention is paid to the harmony between human and nature, and ecology construction promotion is put on the prominent position. The future water conservancy work in the pastoral area will highly respect the nature and science and pay attention to the self-restoration capability of the nature. We will reasonably develop and use the water resources in the pastoral area to protect the grasslands in the pastoral area and promote the harmonious development of the economic society and resources environment.

(1) Accelerating the water conservancy facility construction in the pastoral area The construction will take water-saving irrigation forage lands as the main content. Focusing on the areas of the middle part of Inner Mongolia, northern Xinjiang, the source of the three rivers in Qinghai Province and the surrounding area of Qinghai Lake, in southern Gansu Province, northern Sichuan Province etc., it is planned to develop 2.54 million hm^2 of new water-saving irrigated forage lands by the end of 2020. The annual forage output can increase by 37.4 billion kg, which could provide forage for more than 50 million sheep. This will help restore and protect the ecological environment of 170 million hm^2 of natural grassland. The basic balance between grass and livestock can be achieved, and the grassland degradation phenomenon resulting from overstocking will be eliminated. Rely on self-restoration capability of natural grasslands to enable the natural grassland ecology to gradually move towards the virtuous circle.

(2) Enhancing the management of the development and utilization of water resources To enhance the irrigation forage lands construction must be on the premise of the rational development, utilization and protection of water resources. The development and utilization of water resources must be guided by the regional and catchment water resources management plan. The argumentation, as well as examination and approval rules on water resources of the construction project should be strictly implemented. In particular, the grassland's underground water should be protected; the scientific and rational exploitation range and volume should be defined, and the underground water resources' dynamic monitoring should be reinforced during the project's implementing process. The exploitation plans should be promptly adjusted when problems are discovered. Meanwhile the comprehensive utilization of administrative, economic and technical means should be adopted to enhance water measurement and management, strictly enforce water saving policy and improve water use efficiency. The reasonable pricing mechanism and charging system should also be established to promote the saving and protection of water resources.

(3) Strengthening the management and research work Due to scarce rainfall and fragile ecology in most of the grasslands of China, the development and utilization of the water resources is very sensitive. Therefore, the reasonable development and utilization should be made on the basis of the scientific planning to actually realize "the small-scale construction and the large-scale protection." The influence on water resources in the grasslands brought by the global climate changes should be particularly analyzed, so as to adjust the threshold value of the development and utilization of the water resources according to

the new situation .The research of the water requirement mechanism of the pasture grass on the grasslands and the irrigation system of the artificial? grasslands should be further strengthened so as to provide scientific evidence for the large-scale promotion of the water-saving irrigation of forage lands .According to the actual development of economic society ,enhance the management system and operational mechanism study of water conservancy projects in pastoral area to ensure the affordable establishment ,better management and long-term benefits of various hydraulic engineering projects .

Ladies and gentlemen ,it is the common responsibility of humanity to protect the ecological environment .The Chinese government has determined to vigorously develop ecological civilization ,establish the resource-saving and environment-friendly society and march along the more orderly ,healthier and more rational development road ,and has formulated a series of ecological protection plans .With the implementation of various plans ,the water conservancy work aiming at ecological protection in pastoral area will be further developed and the ecological protection of grasslands will be further strengthened .The Inner Mongolia Autonomous Region is one of the earliest regions in the development of the ecological protection and restoration of the Chinese grasslands with conspicuous results .Everybody is welcome to conduct field survey in Inner Mongolia and other provinces .

Finally on behalf of the Ministry of Water Resource of the People's Republic of China ,I would like to express our sincere gratitude to International Grassland Congress and the International Rangeland Congress committees for their long support and help to China .

I would like to extend my best wishes for the success of the conference !

Thank you .