

Explore a New Mode of Development for Pastoral Areas through Establishing a Special Zone of Ecological Prataculture

Since the implementation of reform and opening up, great dietary changes have taken place in China, which is represented by the decrease of staple grain consumption and the increasing consumption of meat, milk and eggs. However, no adjustment in agricultural structure has been carried out to address the changes and no sufficient attention placed on the forage (including herbage) production. As a result, on the one hand, it has further undermined China's food security, and on the other hand, it has severely hindered the production mode reform in traditional pastoral areas, leading to their low productivity and long-term grassland degradation. To tackle the challenges, the establishment of a special zone for ecological prataculture (SZEP) is suggested by a taskforce of the CAS Academic Divisions (CASAD) based on in-depth studies. It stresses such a zone could serve both as a technological and institutional norm for ecological prataculture and the modern grassland animal husbandry and as a good example of economic, social, cultural and ecological progress in grassland. The following is an English summary of the recommendation.

1. Current Predicament of Agriculture Structure

The past three decades have witnessed dramatic changes in Chinese people's dietary structure following the constant improvement of their living standards. Annual grain consumption per capita has reduced by 47% from 227 kg to 119 kg; and the annual animal food consumption per capita has increased by 161% from 18 kg to 47 kg. In addition, of the overall grain consumption in China, food grain consumption is decreasing each year to 27% in 2012; and that of feed grain is increasing each year to 40% the same year. This situation has not only

intensified the grain competition between people and livestock, but also led to an enormous waste of biological yield of crops with large amounts of grain used as feed for livestock and poultry. However, no transformation has been made in China's agriculture and production mode to address the challenges. We still place much importance on food grain import with the negligence on feed supply.

This unbalanced agricultural structure has grave consequences. First, it suffers an acute lack of forage, which has to be supplemented with staple grain. This not only causes a severe waste of the natural resources (such as land and water), which China is very short of in the first place, it also creates China's strong dependence on good forage importation, posing a threat to China's food security. Second, large amounts of chemicals, pesticides and herbicides have been applied to seek grain production growth, resulting in the pollution of rivers, lakes and soil. Third, the negligence of, and insufficient investment into, prataculture has led to a backward production mode and low productivity, failing to deliver a satisfactory settlement of three pastoral issues (pastoral areas, prataculture, herdsmen) in the area, and its economic-social-ecological pressure. If three rural issues (rural areas, agriculture and farmers) are "the weakest link and the most prominent and severe" problem blocking China's socioeconomic growth, the three pastoral issues are even more striking.

China's food security problem, in the final analysis, has evolved into a problem of forage security. Therefore, it is urgent to transform China's agriculture structure and production mode. In order to energetically develop modern prataculture in pastoral areas and Agro-pastoral ecozone, it is of importance to promote the productivity of grassland while preserving its ecological system. It



is the only way to best address the problems of grain competition between people and livestock and the severe lack of forage (including herbage). It is also an important step to modernize pasturing areas and to settle three pastoral issues in China.

2. Ecological Prataculture: An Important Guarantee for China's Food and Ecological Security

A development of the traditional idea of paratulture, ecological prataculture emphasizes the coordinated fulfillment of the dual functions of grasslands: productive and ecologic progress while stressing both grassland ecology and prataculture.

China has more than 400 million hectares of various grasslands, which makes up 41% of its territory area and is 3.3 times the size of its farmland. Therefore, grassland should play an important role in guaranteeing China's food and ecological security. However, due to the extremely backward production mode and very low productivity of China's prataculture, the country's animal husbandry industry contributes only a small fraction of the country's gross agricultural output value. For example, while the grassland acreage of the six major pasturing regions (Inner Mongolia, Xinjiang, Sichuan, Tibet, Qinghai and Gansu) makes up 74.5% of the national total and 30.5% of China's territory, the output value of their animal husbandry industry accounts only for 16% of the national total, and 5% of the national gross agricultural output value. It is obvious that the potential of China's grassland production and ecological functions have yet to be fully tapped.

In terms of productive function, the 402 million hectares of grasslands support only 160 million people while 120 million hectares of farmland provide lion's share of the grain, vegetable, meat, egg and milk needed by nearly 1.2 billion people in urban and rural areas. The aboveground biomass (stalks and seeds) of the country's farmland land totals 1.2 billion tons while the biomass of its grasslands is only 300 million tons. The per-unit-area bio-productivity of grasslands is only 7.5% of that of farmland. It is estimated that the life support capacity of China's grasslands is only 4% to 5% of that of its farmland. If the figure is raised to 10%, it means that we could have another 86 hectares of farmland to provide food to 350 to 500 million people. Therefore, the production potential of China's grassland is huge.

Regarding ecological functions, the vegetation of pastoral areas has remarkably recovered since the launch

of the strategy of China's west development, the program of "returning grazing land to grassland" and the program of controlling sandstorms in the Beijing and Tianjin area in particular. However, the grassland ecology in the whole territory tends to be "locally improving and nationally deteriorating." There is a huge pressure for national ecological compensation. At present, more than one third of China's grassland is moderately or heavily degraded. The vegetation of the grassland that has been recovered from degradation remains very fragile, and the task for overall grassland recovery in China is arduous.

Analyses show that there is a huge potential for the improvement of both production and ecological functions of China's grasslands, and it could be realized through overall planning, top down designing and scientific management. The development of ecological prataculture is a multi-dimensional systems engineering program, involving nature, economy, society and culture. It couldn't be solved by a single policy, technology, project or small-scale demonstration. An overall design and control of multi-elements such as nature, economy and society should be made with a complete socioeconomic institution as a basic unit. Therefore, a plan for establishing an SZEP is presented with the objectives of realizing a coordinated development of production, life and ecology in the zone through eight to ten years of modernization governance.

3. Planning for Establishing an SZEP

Since the reform and opening up, many urban special economic zones and agro-tech demonstration parks have been set up in China, playing a leading role in socioeconomic progress and modernization drive. However, there has not been any comprehensive demonstration zone for economic-technological development of prataculture in vast grassland. There is also a lack of fulcrum and success models for ecological progress in pastoral areas. In light of the successful experience in establishing special zones in China, building a pilot zone to promote both productive and ecological progress in vast grassland, i.e. an SZEP, is an efficient way to address multiple difficulties facing China's animal husbandry development and grassland degradation. It accords with the common practice of "doing pilot project before popularization" and the principle of "handling special cases with special methods." An SZEP refers to an S&T-oriented demonstration entity in a county (or banner) or a special region designated by the government, which integrates cutting-edge S&T findings, scientific planning, and fine management in line with the ideas

of modernized agriculture. While striving to improve the ecological function of grasslands by a big margin, it places first priority on artificial pasture development and modern animal husbandry, which is supplemented by various biological and cultural industries with special features. It will be a large-scale demonstration zone for exploring a development mode of ecological prataculture with Chinese characteristics, servicing as an example for promoting ecological progress in grasslands. Being a special zone, it features a unique development mode, an innovative management system, powerful key technologies, and distinctive industrial structure.

Different from other special economic zones (such as the one in Shenzhen) which are driven by high and new technologies and adopts technology-intensive production mode, SZEP makes grassland as the object of its protection and the means for its production. With strong spatial heterogeneity and nature-dependence, its production activities need large maneuver space. Therefore, SZEP should have large enough area (over 10 thousand square meters). Only in this way, can SZEP play a full part in ecological progress, and can its biological products achieve scale efficiency and have a market.

The fundamental tenets for SZEP are to achieve both productive and ecological progresses through scientific allocation of productive and ecological functions of grasslands. Specifically, it will use about 10% of the grassland with good water and heat conditions to develop intensified artificial meadow, which is to raise high-quality grass productivity of SZEP by about 10 times so as to mitigate the contradiction between pasture and livestock. And then, it will take measures to protect, recover and reasonably use the remaining 90% of the native pasture, and upgrade its functions as ecological barrier and ecological tourism.

The main lines of businesses of SZEP will include four industries and one complex, i.e. precision artificial prataculture, modern meat & dairy industry, special biological industry, tourism of grassland culture, and grass-husbandry-science-engineering-trade complex. As a terminal platform for sales of the complex, SZEP will open large-scale supermarkets in big cities such as Beijing or Shanghai to sell the organic food it produced.

4. Policy Requirements for Establishing an SZEP

Upon the above consideration and extensive investigation, we suggest that the central authorities endorse the joint proposal of CAS and Inner Mongolia

Autonomous Region to set up an SZEP. To this end, a leading group and an executive taskforce should be formed to coordinate and promote its preparatory work. The establishment of such a special zone requires policy and finance support in a variety of aspects, ranging from administrative organization, land management and production mode, resource exploitation and utilization, social organization, to human resources, taxation, and education and training. A preliminary suggestion for its sitting is that it might be located in Inner Mongolia's Xilingol grassland (such as Wulagai Development Zone or Zhenglanqi Banner). The following are specific recommendations.

1. To reform administrative system. A leading group and executive taskforce, which are to be jointly established by CAS and Inner Mongolia Autonomous Region, will shoulder the responsibility for coordinating the preparatory work of the SZEP, selecting its administrative region, its detailed planning, its core technology system improvement, and exploration and pilot of its production mode and management system reform.

An SZEP administrative committee and government should be established upon satisfactory preparation work. The administrative committee, which should be staffed by outstanding experts and local officials from such fields as science, technology, business management, economics and policy, will be responsible for making decisions on major administrative issues, and policy and planning making for the development of SZEP. The Government, which is subject to the guidance and supervision of the administrative committee, will implement its decisions. The Committee and the Government should enjoy efficient automation.

2. To reform land and grassland management system, and establish an advanced administrative system for production and management in SZEP. It is advisable to carry out pilot studies on the management system reform of land and meadow in the pastoral areas and its organization reform. In line with a unified land planning of SZEP, a new land administrative system should be implemented under the guidance of the Government. The management power of land and meadow will be transferred to large-scale specialized farmers, family ranches, herdsman coops, and large-scale enterprises. Efforts should be made to enlarge the investment into the land and meadow, and to strengthen the promotion and application of new technologies, so as to realize the economy of scale, intensive management and



specialization of land and ranch operation.

3. To reform taxation policy and improve ecological compensation mechanism. At present, several taxation policies (such as mineral resource tax revenue allocation between the national government and local government, and the taxation on the processing industry of grass and husbandry products) in the pastoral areas fail to encourage enterprises and other stakeholders to invest in pastoral development, making it difficult to support production mode transformation in the pastoral areas with sustainable finance and taxation guarantee. In addition, the legislative system of the compensation and rewarding mechanisms for grassland ecological protection is weak and unable to clearly indentify the rights, obligations and duties of the stakeholders, and fails to efficiently regulate the contents, modes and standards of the compensation. It is advisable for the future SZEP to address the policy bottlenecks, build up its capacity for further development, and make rapid changes from ecological compensation to tax revenue return in SZEP.

4. To implement incentive policies for human resources and strengthen the professional training of herdsmen. It is advisable for the future SZEP government to launch incentive policies to encourage various professionals, such as college graduates, to work in pastoral area. People with outstanding expertise, strong management skills and practical experiences should be selected to lead technical or administrative departments

of the government. It is advisable for the government to appoint outstanding college graduates to lead villages and townships to carry out various decisions made by the government. Professional schools should be set up to train new generation of farmers in prataculture and animal husbandry, and technical and managerial professionals. It is also important to teach herdsmen technical skills, help them find jobs and promote the national solidarity and social stability.

5. Set up a first-class applied technology research and transfer center for prataculture and animal husbandry, providing SZEP with solid S&T support and reserve to achieve its success in both productive and ecological progresses, and to put into practice the ideas of innovation-driven development in pastoral areas. A strong technical system should be set up to support a wide industrial spectrum in SZEP, ranging from variety breeding, forage growing, harvesting and processing, livestock and poultry breeding, management, intensive processing and logistics. The center should adopt the business operation mechanism of a business enterprise with the objectives of building up a technical system featuring resource-conservation, high-efficiency, low-cost and environmentally-friendliness. It will meet the current and future requirements and needs of SZEP for production practice, do a demonstration for neighboring pastoral areas and promote their development of technological upgrading and socioeconomic progress.

