

A Study on the Ecological Environment Management in Prairie Pastoral Areas under the Supply-side Structural Reform

Based on a Survey in Anqu Town, Hongyuan County, Sichuan Province

Gefen Zhou

College of Tourism

Sichuan Agricultural University

Dujiangyan, China

Abstract—Located in the Tibetan Plateau of Northwest Sichuan Province, the Hongyuan Pastoral Area is a national contiguous poverty alleviation area and also a typical ecologically sensitive area. Herdsmen are the most important economic activity subject and the most basic decision-making unit, whose production behavior has directly affected the economic level and ecological environment of pastoral areas. The pastoral areas have undertaken the double responsibility of economic development and ecological security. In this study, the author adopts the Participatory Farmer Assessment Method (PRA) for an analysis on the current situation of economic development and ecological environment of pastoral areas based on field research with Anqu Town, Hongyuan County, Sichuan Province as the location for case study. The study results have shown that various bottlenecks restricting the ecological environment in the pastoral areas include the irrational industrial structure, extensive economic growth mode and herdsmen's weak ecological awareness and lagging ecological behavior. On this basis, the author proposes strategies for precision poverty alleviation and ecological environment management in pastoral areas.

Keywords—prairie pastoral area; anqu town of hongyuan county; ecological environment

I. INTRODUCTION

In recent years, overgrazing, trampling and excessive digging have frequently occurred in pastoral areas. Besides, the ecological environment where most of pastoral areas are located is fragile, causing constantly deteriorating ecological environment, which poses a serious threat to the economic and social sustainable development of pastoral areas. In the meantime, most of the prairie pastoral areas have been suffering backward economic development and facing the dual task of accelerating economic development and protecting ecological security in pastoral areas. Therefore, it has become an urgent task for the development of pastoral areas to figure out how to ensure the development of local economy while protecting the ecological security of prairies. In this study, the author, from the perspective of supply-side structural reform, proposes measures to promote economic development and ecological environment management with

Anqu Town, Hongyuan County, Sichuan Province as the location for case study on the basis of an analysis of factors that restrict economic development and ecological security.

II. DATA SOURCES AND RESEARCH METHODS

A. Data Sources

The socio-economic statistics mainly come from Hongyuan County Statistical Yearbook and Anqu Township Government. The data on industrial structure, economic growth and herdsmen's perception on the ecological environment and behavior come from interviews and questionnaires conducted during August 10-15, 2016.

B. Research Methods

The Participatory Farmer Assessment Method (PRA) is adopted for data acquisition. PRA refers to a method used to get a certain understanding of local situation through informal interviews with residents in the study area. It is also a method of learning from the community, investigating, analyzing and evaluating various constraints and opportunities for the community development jointly with people in the community and finally making practical research and development plans [1]. The semi-structured interviewing method for the application of PRA is provided by certain interviews, which, however, is not limited to these interview outlines. Instead, interviews were conducted around the topics, where interviewees can show their views on the local industrial structure, income and ecological environment and express their attitudes.

The survey for this study was carried out with the help of students of Tibetan ethnic group in Hongyuan County and local residents who could speak Chinese at their request. The survey lasted for nearly a week, when first of all, members of the research team explained basic information to the personnel involved in the survey and then randomly selected herdsmen for face-to-face interviews. Due to language barriers and time constraints, 120 herdsmen were involved in

the survey and 90 valid questionnaires were retrieved. The basic situation of survey objects are shown in "Table I".

III. AN ANALYSIS ON BOTTLENECKS OF ECOLOGICAL ENVIRONMENT MANAGEMENT FROM THE PERSPECTIVE OF SUPPLY-SIDE STRUCTURAL REFORM

A. Great Pressure on Ecological Environment of Grasslands Caused by Unreasonable Industrial Structure

TABLE I. DESCRIPTIVE STATISTICS OF RESPONDENTS' CHARACTERISTICS

Category		Frequency	Percent (%)
Gender	Male	50	54.5
	Female	40	45.5
Length of education	0	19	21.1
	1-6	36	40.0
	7-9	24	26.7
	10-12	4	4.4
	13 or longer	7	7.8
Age	18-30	49	54.4
	31-40	20	22.2
	41-50	12	13.3
	51-60	9	10.0
Occupation	Those involved in two industry	11	12.2
	Husbandry Producer	38	42.2
	Unemployed	11	12.2
	Totally Migrant Workers	10	11.1
	Others	20	22.2

Anqu Town, Hongyuan County is a typical purely husbandry-based area, where animal husbandry in the primary industry is the basic and most important industry while the development of the secondary and tertiary industries lags far behind that of the primary industry. At present, animal husbandry in the primary industry accounts for about 80% of the total income and plays a dominate role in the income of herdsmen. The processing industry in the secondary industry is mainly about the production and processing of yak products, namely the dairy products, which is also at the primary stage. Although cooperatives have already been established, there is a lack of perfect organization and professional talents for management. The income from the secondary industry accounts for about 10% of the total income. The development of the tertiary industry is mainly manifested in the tourism industry, which is also in the initial stage. There have currently been eight restaurants with Tibetan style of different sizes in Anqu Town, whose main business items are based on Tibetan food and horse riding, accounting for about 5% of the total income. Due to difficulty in resources integration and insufficient force for full development in the entire and resources exhaustion caused by the unreasonable industrial structure, especially the single industrial structure, tremendous pressure has been posed on the ecological environment in pastoral areas.

B. The Loss of Balance in the Ecosystem Because of Extensive Economic Growth Model

The extensive economic growth path was taken for the economic development in the traditional pastoral areas,

which mainly relies on excessive investment in grasslands to promote local economic development. In Anqu Town, there are currently 4206 people from 75 copeasant households and 787 single households and each household attempts to increase the total number of herds reared in the family through increasing the number of family members (currently, only the Halama village regulates that the maximum number of yak a person can raise is 18, while other villages do not release specific regulations). They also try to increase income by dig *Cordyceps sinensis*, fritillary and other valuable Chinese herbal medicines. The surrounding environment is seriously damaged by various restaurants with Tibetan style, for example, the parking lot may damage the grassland, and there is a lack of standards for temporary construction of various reception tents and parasols as well as the sewage and garbage disposal in the kitchens and toilets. As a result, the ecological balance of the grasslands is broken by excessive breeding of livestock, excavation of *Cordyceps* and *Fritillaria* and other extensive economic growth models as well as unregulated business operation of restaurants with Tibetan style.

C. The Herdsmen's Weak Ecological Awareness and Lagged Ecological Behavior

It is found through the questionnaire survey that herdsmen's awareness of local ecological environment and behavioral are as follows. 60.7% of herdsmen only heard of or don't know about the Prairie Law. Half of herdsmen think that plowing and reclaiming grasslands have little or even no impact on grassland ecology. In the eyes of herdsmen, main human factors for grassland desertification and the proportion they took up respectively are overgrazing (28.6%), poor management (26.8%), estrepement (21.4%) and digging of *Cordyceps* (14.3%), while main causes for deforestation are improper management (41.1%), lack of awareness (21.4%), life reasons (10.7%) and legal factors (7.4%). Most herdsmen believe that grassland desertification will harm the environment and ecology (55.4%), agriculture and animal husbandry as well as daily life (25%), while 19.7% of herdsmen still do not understand consequences of grassland desertification. 30.4% of herdsmen believe that they should bear 31-49% responsibility, 21.4% of herdsmen believe that they should bear 50% responsibility, while 23.2% of herdsmen believe that they should bear over 50% responsibility for grassland desertification. 96.4% of herdsmen have different degrees of concern that grassland desertification affects production and life, 44.4% of herdsmen believe that the government attaches great importance to local desertification, and 7.8% of herdsmen think that the measures taken by the government to control desertification are effective.

It is found through the survey on ecological behavior that 80% of the herdsmen personally participate in afforestation and grass cultivation to protect the ecological environment, 55.5% of the herdsmen are willing to spend money to install solar energy devices, 64.8% of the herdsmen are willing to do voluntary work for the desertification management of grasslands, 27.8% of herdsmen are unwilling to perform voluntary work and 7.4% of herdsmen believe that they

should be paid. 37% of herdsmen are willing to finish ecological immigration under the government's financial assistance, 48.2% of herdsmen are reluctant to immigrate, and 14.8% of herdsmen think ecological migration is optional with the key factor as government subsidies. 51% of herdsmen are open to grazing prohibition according to the state's policy of returning livestock to grassland, while 49% are still reluctant to the policy of grazing prohibition.

In general, herdsmen in Anqu Town, Hongyuan County have a certain degree of ecological awareness and are willing to make certain efforts for the local desertification management. However, local herdsmen also show weak ecological awareness as well as solidified ecological thoughts and behaviors due to the long-established concepts and living habits.

IV. STRATEGIES FOR ECOLOGICAL ENVIRONMENTAL MANAGEMENT IN PRAIRIE PASTORAL AREAS

A. Accelerating the Construction of Modern Industrial System and Promoting the Optimization and Upgrading of Industrial Structure

1) Cultivating advantageous industries or new industries: Vigorously developing and cultivating characteristic industries in pastoral areas can be achieved from the following aspects.

- Develop characteristic plantings, especially Chinese herbal medicines with beauty and health care functions, because the development of planting industry can increase the income of herdsmen as well as lead to diversify in industry.
- Develop the processing industry of animal husbandry products and traditional Chinese medicines. At present, the processing industry in pastoral areas is mainly concentrated in slaughtering and freezing and other primary processing stages. Even a large number of live yaks are exported. The existing processing industry is mainly about yoghurt processing, but there are only few yoghurt processing plants, without large-scale production. Because of the few varieties of Chinese herbal medicines, the processing and manufacturing of Chinese herbal medicines should be based on the planting those with beauty and health care functions by use of the favorable climatic conditions.
- Vigorously develop the Tibetan culture industry, especially the Anduo Tibetan culture industry. Ethnic customs and cultural heritage come as important foundation for the development of the Tibetan cultural industry, which rely on entities to display. Therefore, it is possible to achieve this goal through the establishment of museums, ethnic culture and industrial parks, the holding of yak festivals and so on. At the same time, various measures can be taken like developing of the handicrafts of Ando Tibetans to inherit national culture.

2) Developing tourism and promoting rationalization of industrial structure: Tourism is a highly comprehensive industry, whose development not only involves various elements such as food, housing, transportation, travel, shopping and entertainment, but also is related to the core industries like the catering industry, accommodation industry, transportation industry and entertainment industry as well as auxiliary industries like the construction industry, financial industry, insurance industry and communication industry. Therefore, tourism development can stimulate a large number of industries in pastoral areas and effectively promote the rationalization of industrial structure. In general, tourism is an industry with a relatively small impact on the environment, which can attract more herdsmen to engage in tourism services, transfer part of the labor force from the original development of animal husbandry and reduce the damage caused by overgrazing on the environment. It is found from the survey on the Anqu Town, Hongyuan County that currently there are 8 Tibetan-style restaurants engaged in tourism reception, with main service as horse-riding, yogurt, Tibetan food and local specialties. They can only provide few products and services, limited to food, travel, shopping and other aspects. The six major elements of tourism have not been perfected and therefore failed to promote the development of other industries. As a result, it is necessary to vigorously develop the tourism service industry to promote the rationalization of industrial structure.

3) Promoting the transformation of economic development mode of traditional animal husbandry and developing modern animal husbandry industry: Modern animal husbandry industry is derived from modern agriculture and therefore belongs to this category, whose concept is specialization, large scale, standardization, industrialization and marketization. The traditional small and all-inclusive breeding model will be eliminated by the new development trend. Only with specialization and large scale, agglomeration effect and market advantages can be formed. Various standards must be adopted to standardize the market so as to produce pollution-free, green and organic food and form a brand advantage. With the brands, it is possible to enter supermarkets and occupy a greater market share. In this process, animal husbandry can be armed with modern industry, modern science and technology, and modern economic management methods to achieve the transformation from traditional husbandry into modern husbandry industry [2][3].

B. Promoting Circular Economy and Strengthening Energy Conservation and Emission Reduction

Circular economy is an effective way to solve supernormal consumption of resources, deterioration of ecological environment and extensive management. In combination with the industrial foundation and development goals of Anqu Town, Hongyuan County, it is necessary to reduce the generation of pollutants from the source of production and services and realize resource circulation from

the process. According to the actual situation of industrial development in Anqu Town, the goal of energy conservation and consumption reduction as well as circulating utilization of wastes should be achieved by constructing the internal circulation among the primary industry, the secondary industry and the tertiary industry and develop circular economy among different industries. The fundamental way out is to develop husbandry recycling economy in the primary industry with developing ecosystems and animal husbandry economic systems as the goal and promote the balanced and lasting development of pastoral production and livestock production, natural reproduction and economic reproduction processes. A representative form of the circular economy in pastoral areas is the organization of seasonal production of animal husbandry and promotion of the resource allocation mode of off-site fattening technology. In other words, it is a production method to rationally allocate resources and organize seasonal livestock husbandry production according to the time difference in the biological growth law to achieve the balance between grass and livestock and ecological balance[4]. The circular economy of the secondary industry can be completed through the construction of a modern recycling industrial park where 4R recycling economy development is maintained and energy conservation and emission reduction are achieved in the production process. The circular economy of the tertiary industry includes tourism, hotels, restaurants, entertainment, sanitation, property management, logistics, information, finance, education and culture. The idea of circular economy should be implemented from beginning to end based on the three aspects of main body of service (scenery spots, hotels, universities, culture, property management and other industries), service channels (providing all kinds of pleasure and enjoyment services), service objects (tourists, lodgers, teachers and students, consumers) and the entire process of each aspect in terms of both software and hardware to ensure good economic cycle at the input end, process and output end [5]. Finally, it is necessary to promote circular economy among the three industries, like vigorously developing various environment-friendly industries including tourism industry, cultural industries and other related service industries to reduce the excessive dependence of pastoral areas on resource-intensive industries, gradually form complementary advantages and mutual promotion among the three industries and jointly promote the economic and social development in pastoral areas.

C. Developing and Standardizing Specialized Cooperatives in Pastoral Areas

The state has introduced grazing prohibition and other related policies to prevent the deterioration of ecological environment in the pastoral areas. Because of the small production scale of individual herdsmen and low production efficiency, it is difficult to better implement grazing prohibition and protect the ecological environment, which also affects the economic incomes of herdsmen. Under such circumstances, further developing and regulating cooperatives can be an important way for the development of modern animal husbandry, where the cooperative approach can be adopted to form the scattered human, material, and

financial resources so as to achieve intensive development of animal husbandry and easily create local brands. This is an important way to effectively solve the contradiction between livestock and grass and increase the income of pastoralists in the meantime.

D. Improving Herdsmen's Ecological Awareness and Nurturing Modern Herdsmen

To improve the ecological awareness of herdsmen and establish the awareness and concept of ecological civilization, three changes in consciousness must be made, among which the first is to establish the concept of harmony between man and nature to harmonize the socio-economic development with the natural environment, the second is to transform from extensive to intensive economic development to enhance the capacity for sustainable development and the third is to establish the concept of fairness so that the development of contemporary human economy does not sacrifice the interests of future generations. There are multiple channels for cultivating herdsmen's ecological concepts, like the use of media videos on the ecology concepts, such as radio and television media, online education and the provision of ecological civilization in the curriculum of primary and secondary schools in order to educate the herdsmen ecological awareness and bring these ideas to production practice.

V. CONCLUSION

It should cultivate new herdsmen according to requirements of modern animal husbandry and industrial structure adjustment. There are several ways for the cultivation of new herdsmen. The government can take the lead in organizing vocational colleges or professional skills departments to train herdsmen to improve their modern science and technology knowledge, cultural knowledge and ecological knowledge and enhance their technical and cultural qualities so that herdsmen can understand science, technology and management. It is also possible to absorb a group of outstanding talents or leaders who are good at production and management in pastoral areas through the introduction of talents. It is also important to enrich the herdsmen's cultural life by vigorously developing cultural life in pastoral areas such as building libraries, performing teams and cultural activity rooms.

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