

# *Sustainable Development of Regional Economy in Animal Husbandry*

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**Abstract:** On the basis of not destroying natural resources and ecological environment, relying on scientific and technological progress and improving the comprehensive production capacity of animal husbandry can continuously meet the needs of contemporary and future generations for the development of animal products. This article summarizes the successful experience and lessons of the development of ecological aquaculture in other advanced counties and cities, conducts scientific positioning and reasonable planning, puts forward development ideas and policy suggestions with practical guiding significance and application value, and explores a suitable for the development of modern ecological aquaculture in the regional economic development of livestock Road, with a view to providing reference and reference for the development of the similar township ecological breeding industry in the whole region. This article analyzes the current situation of my country's animal husbandry development, the problems of regional economic sustainable development and related countermeasures. The results show that the natural growth rate of my country's population is only 1.6% per year, indicating that my country's population growth has not been well controlled. Purchasing forage can increase the total income of herdsmen and is an important factor in promoting the growth of herdsmen's income and the sustainable development of the grassland economy. In general, animal husbandry is developing in a good direction.

## **1. Introduction**

Animal husbandry is the oldest basic industry for human survival and development, and it is also an important part of agriculture. From the perspective of regional distribution, grassland animal husbandry is mainly concentrated in the northwest, frontier and minority areas. Its sustainable development is not only related to the national ecological security, but also to the stability of the sword border and the economic prosperity of the minority areas. In recent years, the development of

animal husbandry in China has encountered many difficulties.

Compared with the developed areas of animal husbandry abroad, there is still a certain gap in the development speed, scale and benefit of animal husbandry in China [1]. Therefore, it is necessary to carefully summarize and reflect on the constraints of the development of animal husbandry in Inner Mongolia, make full use of two kinds of resources and two markets at home and abroad, optimize resource allocation, and seek and adjust new development strategies [2]. From the analysis of various factors, it can be seen that the implementation of ecological recycling aquaculture model is the inevitable choice for the sustainable development of animal husbandry in China [3]. The construction of modern ecological recycling aquaculture model is a systematic project, involving many main aspects of animal husbandry, affected by many factors [4]. Aquaculture is a special industry, its location is often affected by natural resources and other factors [5]. Therefore, on the basis of successful model and advanced technology, combined with local characteristics, select and design reasonable and effective model to optimize traditional animal husbandry [6]. Due to the special geomorphic environment in some areas of China, the frequent occurrence of agricultural natural disasters and the deterioration of agricultural ecology have seriously hindered the sustainable development of agriculture in Guizhou Province [7]. The development of rural economy is relatively backward, the production of animal husbandry is relatively simple, the scale of animal husbandry is relatively low, and the production scale of breeding farms is significantly different, mainly farmers scattered planting. Backwardness of breeding concept, low level of animal husbandry production, piling up of livestock and poultry manure, and serious environmental pollution restrict the sustainable development of animal husbandry [8]. Therefore, the development of sustainable animal husbandry can promote the economic and social stability and rapid development of Guizhou Province [9].

He K tries to prove that the sociological concept of social capital can affect the willingness of farmers to reuse agricultural wastes. Through the control of human capital and material capital, he proves that social capital has a significant impact on Farmers' willingness to use agricultural waste for CEA. In terms of driving farmers' will, the marginal utility of social capital varies with different dimensions. Specifically, institutional trust is the biggest driving force, followed by citizen participation, interpersonal trust and reciprocal network norms. He also verified that higher education level, surplus labor (human capital variable) and waste facilities (material capital variable) can improve farmers' willingness to reuse agricultural waste for CEA. The effective ways to improve farmers' willingness to use agricultural waste resources include establishing learning organizations, strengthening the adaptability of rural environmental laws and regulations, and forming a social atmosphere of mutual trust and mutual benefit [10]. Kwon reviewed the research progress of NTP related to animal husbandry infrastructure in recent years. Animal husbandry infrastructure refers to the basic facilities and services necessary for improving the living conditions and economic operation of animals and improving productivity [11]. Grassland animal husbandry project is an important engineering measure to control karst rocky desertification and an effective way to restore ecology and economic development. Song systematically reviewed the research progress of grassland construction and ecological animal husbandry in karst areas in the past 50 years. [12].

Guided by the theory of sustainable development of animal husbandry, this paper constructs the evaluation system of sustainable development of animal husbandry, evaluates animal husbandry comprehensively, and provides guidance and decision-making basis for animal husbandry production. All over China have implemented the recycling aquaculture model, but the specific model, the implementation situation, the lack of ecological recycling aquaculture, the improvement of local and economic benefits are not clear. Only by fully understanding these, can we ensure the smooth promotion of ecological recycling aquaculture mode and the improvement of ecological,

social and economic benefits. It is of great theoretical and practical significance to study the sustainable development of animal husbandry regional economy for China's reform and opening up and economic construction.

## **2. Sustainable Development of Animal Husbandry**

### **2.1. Animal Husbandry**

At present, China's large-scale and intensive development process is speeding up, but retail investors still account for the majority, mainly due to the lack of technical support and supporting equipment, leading to the development of animal husbandry is greatly limited, and it is difficult to achieve the expected results. In addition, the awareness of environmental protection needs to strengthen the basic principles of the development of modern animal husbandry, which is actually the coordinated development of ecological, economic and social benefits. Due to the role of traditional aquaculture, the development of animal husbandry in rural areas of China has brought extensive environmental pollution. In the long run, it is difficult to adapt to the actual needs of the development of modern animal husbandry.

The rationality of capital investment needs to be strengthened. In the specific construction process, most of the fixed assets of the site will have a one-time investment surplus, resulting in idle waste of shantytowns, insufficient working capital for breeding production, good construction of livestock and poultry shantytowns, but no acquisition of livestock and poultry feed, which ultimately leads to the break of the capital chain, missed the opportunity to make money from breeding, resulting in losses. Secondly, we should optimize the production structure of animal husbandry. For a long time, most of the rural areas in China still adhere to the traditional breeding habits. In the growth period of livestock and poultry, it is not emphasized to maintain the supply and health environment, which leads to the livestock and poultry in the feces for a long time, and finally leads to serious disease and long growth period. However, it is difficult to improve animal breeds scientifically, which will cause the degradation of most animal breeds to a great extent, and have a significant impact on the disease resistance level, production level and healthy development of the whole animal husbandry.

The breeding industry is based on the planting industry and restricted by the feed base. The further development of animal husbandry depends on the processing industry of animal products, which plays a leading role in the production chain of animal husbandry and plays a key role in the industrialization of animal husbandry. In terms of genetic breeding and development of germplasm resources, there is little gap between China and other countries in terms of breeding theory, genetic evaluation technology and breeding methods, but there is still a big gap in some basic work. There is no unified performance test method in China: there is no strict registration system for improved varieties; there are no genetic and economic parameters directly related to breeding. The breeding of livestock and poultry abroad has changed from variety to variety. There are still some problems in our country's breeding work, such as the dispersion of varieties, the small size of population, the poor ability of seed supply and the inability to form a variety of mating lines. Because of its small scale, single strain and narrow blood relationship, there is no large-scale joint breeding system. The development of livestock and poultry breeding industry is unbalanced, and there is no special breed of beef cattle and mutton sheep; in terms of nutrition and feed science, in-depth understanding of animal nutrition and function, and continuous improvement of material synthesis technology, it is an important field of nutrition research in the future to combine modern biotechnology to study the molecular mechanism of nutrients with traditional nutrition research methods.

## 2.2. Theoretical Basis of Regional Economy in Animal Husbandry

When analyzing and solving problems, it is not enough to only attach importance to the role of each unit. We should pay attention to the overall effect. The simple addition of each element does not constitute a real whole. At the same time, the pursuit of the overall benefit of optimization is the most important point of modern holism. It not only pays attention to the optimization of monomer, but also the optimization of the whole. It requires people to dynamically master the relationship between the whole and the part, and between the part and the part, so that each part of the function is subordinate to the overall optimal goal, so as to achieve the expected overall benefit; the pyramid theory reveals the law of material circulation and energy flow in the biological system, and points out that when the material and energy are transformed from one organism to another. In this way, the organisms at all levels of the food chain are arranged into digital pyramids from large to small according to a certain quantitative relationship. There are several views on the application of food chain to animal husbandry. The level of nutrition is closely related to energy consumption. The longer the food chain, the higher the nutritional level and the more energy the food consumes. In any case, the longer the chain, the better. Therefore, in the design of animal husbandry circular economy, we must avoid blindness, pay attention to the use of low-level nutrition and energy in the food chain to get the best use, and take out products from the ecosystem as soon as possible. Indicators under the same target level should be relatively independent, and duplication should be avoided as much as possible between indicators. Causality should be avoided as much as possible between indicators to properly ensure that the structure of indicator system is clear, the number of indicators is appropriate, and the number of indicators is appropriately calculated. Coordinated development of regional economy is a relatively complex measurement and evaluation, among which there are many factors, which are needed by the indicator system of coordinated development of regional economy. Comprehensively and systematically reflect the evaluation of whether a region can achieve coordinated development. The selection of indicators needs to consider many facts, refer to various materials and select scientific and reasonable indicators. The coordinated development of regional economy is not a short-term goal that can be achieved in one or two years, but a long-term goal that can be achieved. The selected indicators need to consider the dynamic change factors, and use the data of several consecutive years to select indicators. Some index data in the preliminary index are not found or unreasonable, and should be adjusted according to the actual situation. Considering the three target layers of economic development, ecological energy and social development, there are four standard layers under each target layer, and there are specific and diverse indicators under these four standard layers. In general, the coordinated development of economic development, ecological energy and social development is required to fully guarantee the highly coordinated dispatching of regional development. The non-linear evaluation model of production function is adopted as the development index model of coordination degree:

$$H_i = E_i^{\alpha} \cdot S_i^{\beta} \cdot C_i^{\gamma} \quad (1)$$

$\alpha$ ,  $\beta$  and  $\gamma$  represent the weight of economic development, ecological energy and social development respectively. This method reflects the non-linear agglomeration mechanism among all levels of regional economic coordination, and emphasizes the importance of coordinated development of regional economic development, ecological energy and social development. Because the meaning of each specific indicator is different, the calculation method, statistical method and statistical caliber are also different, and the measurement unit of each indicator is also very different. Therefore, the original data of each indicator cannot be used directly, and it needs to be dimensionalized. The specific treatment method refers to the maximum element benchmark method in Zhao Guoqing's paper. The optimal index of each variable is used to divide the index of

each province and region, and the actual index value of each variable in the region is transformed into the comparative advantage index of the optimal region.

### 2.3. Sustainable Development

Sustainable development should be based on the protection of natural resources and ecological environment, coordinated with the carrying capacity of resources and environment; economic development is the condition to achieve sustainable development. Sustainable development encourages economic growth, but it requires abandoning the traditional extensive development mode of high consumption, high pollution and high growth, pursuing the quality of economic growth, improving economic efficiency, implementing cleaner production and minimizing environmental pollution; the goal of sustainable development is to improve and improve the quality of human life and adapt to social progress. Different countries in the world have different development stages and different development goals, but their development connotation should include improving the quality of human life; sustainable development recognizes and requires reflecting the value of environmental resources. The value of environmental resources is not only reflected in the support of environment to economic system, but also in the indispensable survival value of environment to life support system. Sustainable development regards environmental protection as one of the most basic goals, and it is also one of the objective standards to measure the quality, level and degree of development.

The goal of sustainable animal husbandry is still the coordination, unity and orderly combination of economic, ecological and social benefits advocated by modern animal husbandry. Sustainable animal husbandry is not a way to restore traditional animal husbandry, nor a simple continuation of natural animal husbandry, nor a complete denial of traditional modern animal husbandry. It is a further improvement of modern agricultural technology in the process of transformation from modern society to sustainable development society. It is a new concept of development and decision-making that comes with the development of modern technology and resources. Sustainable animal husbandry contains all the essential connotations of modern animal husbandry and embodies the concept of harmonious coexistence between man and nature. Therefore, sustainable animal husbandry is the new trend of modern animal husbandry in essence, and sustainable animal husbandry in modern sense is a kind of sustainable modern animal husbandry.

The key to the effective development of grassland animal husbandry lies in the effective grassland management measures and systems, the establishment of large-scale production system, the centralized management of most of the land, the centralized service for farmers and herdsmen, the establishment of living communities, and the settlement of the artificial and educational problems of farmers and herdsmen. If there are no conditions for large-scale production, the grassland shall be managed scientifically through the small-scale herdsmen's Federation. In the sustainable animal husbandry, the relationship between ecological protection and animal husbandry development is: ecological protection is six conditions, the ultimate goal is to achieve the sustainable development of animal husbandry economy. Ecological protection and animal husbandry development are a pair of contradictory communities. They are interdependent and restrict each other. Good ecological environment is the necessary foundation for the development of animal husbandry. The healthy development of animal husbandry more specifically reflects the value of ecological environment. On the contrary, the deterioration of ecological conditions will inevitably restrict the development of animal husbandry. Without ecological conditions, animal husbandry will lose the space for survival and development.

### 3. Experimental Materials and Methods

#### 3.1. Subjects

In this paper, Qinghai Province is chosen as the object of analysis. Because the cities and counties in Qinghai Province are typical areas of animal husbandry with obvious characteristics of animal husbandry, it is more convincing to take them as the object of analysis. Firstly, this paper analyzes the growth relationship between economic variables and climate variables, the relationship between climate variables and economic variables and the relationship between abnormal rate, and the resistance of economic system to climate factors. In this paper, Xining city is selected as the investigation object, and the investigation data are selected to investigate the reduction of livestock mortality and economic development in pastoral areas in recent years, and the results are analyzed. Combining with the flexible methods of self-improvement, such as herdsmen's purchase of forage, the paper demonstrates its recovery and impact on the economic system. It provides a theoretical basis for the sustainable development of grassland animal husbandry.

#### 3.2. Experimental Method

In order to better grasp the development law of ecological aquaculture, focusing on theoretical analysis is the characteristics of this study; in-depth field survey of Xining towns, mastering first-hand information and materials, closely combining with the current situation of economic and social development of Xining City, to analyze, summarize and summarize, find out the deep-seated problems in the development process of aquaculture in Xining city; in a comprehensive and systematic analysis of the whole west Based on the development potential and existing problems of ecological aquaculture in Ning City, this paper studies the development of ecological aquaculture in each town, and puts forward the development mode of ecological aquaculture. Finally, through the literature search method to analyze the existing research results and deficiencies, find out the position of Xining ecological aquaculture in the development of ecological aquaculture in the whole region, and put forward their own ideas and suggestions.

### 4. Discussion of Research Results

#### 4.1. Comprehensive Evaluation and Analysis of Sustainable Development

The results of the comprehensive evaluation of the four subsystems of society, economy, ecology and science and technology and the development level of animal husbandry are shown in Table 1.

*Table 1. The results of comprehensive evaluation of sustainable development of animal husbandry in Xining*

Index	2013	2014	2015	2016	2017	2018	2019
Social subsystem	0.143	0.143	0.146	0.153	0.145	0.151	0.154
Economic subsystem	0.241	0.251	0.251	0.249	0.265	0.266	0.283
Ecosystem	0.336	0.343	0.338	0.347	0.359	0.374	0.372
Technology Subsystem	0.281	0.252	0.278	0.275	0.264	0.339	0.302
Comprehensive results	0.272	0.264	0.271	0.273	0.279	0.306	0.297

It can be seen from Table 1 that the development level of social subsystem in Xining is the lowest and the development speed is slow. The evaluation value increased from 0.143 in 2013 to



0.154 last year, with an average annual growth of 1.1%. The average annual decline of natural population growth rate index is only 1.6%, indicating that the population has not been well controlled. Although Engel coefficient index has declined, its speed is slow, which shows that the living standard of farmers is still low, which has a great impact on the development of society. The three indicators of illiteracy rate in rural areas, per capita consumption level ratio of urban and rural residents and per capita net income of farmers are all better than the first two indicators, which play a positive role in the stable development of society. The comprehensive evaluation results of the development level of animal husbandry in Xining city are shown in Figure 1.

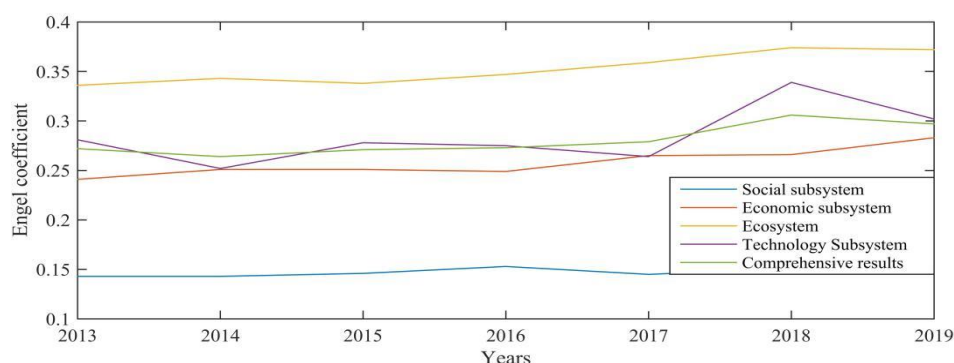


Figure 1. The comprehensive evaluation results of the development level of animal husbandry in Xining city

Figure 1 shows the overall situation of animal husbandry sustainable development in Xining city. From 2013 to 2019, the level of sustainable development of animal husbandry in Guizhou was poor. The comprehensive evaluation value of the overall development of the four subsystems has increased from 0.27 in 2013 to 0.3 in 2019, and the development level of Guizhou Province has increased by 10.3% in 2007. The development of animal husbandry in Xining City in the past seven years is divided into two stages. The first stage: 2013-2019 years, the overall trend showed a steady upward trend. The comprehensive evaluation value was zero point two seven one in 2013, zero point two seven eight in 2011, an average annual increase of zero point five percent. The second stage: 2018-2019 years, the development level of animal husbandry in Guizhou province was relatively fast, and the comprehensive evaluation index was zero point three and zero point two nine respectively, though 2018 was lower than 2019. Down 0.008, but the overall situation is faster than the first stage. The development level of the four subsystems is: ecosystem > Science and Technology > economy > society. Generally speaking, animal husbandry is developing in a good direction.

#### 4.2. Analysis on Environmental Protection Benefits of Different Ecological Circulation Modes

Table 2 shows the comparison of typical ecological cycle models of Xining aquaculture.

From the perspective of efficiency, the typical ecological cycle mode of company a can save more than 500000 yuan of energy every year through self-use biogas power generation, winter pig house insulation and staff life; the harmless treatment system of company B can save more than 200000 yuan of energy. Ecological Park C biogas power generation project, fruits and vegetables fertilizer, etc., can save resources from all aspects and create millions of yuan of environmental protection income. Company D can save about 90000 yuan of electricity every year. After treatment, it can be recycled, saving about 300000 yuan of water cost every year. The comparative analysis of typical ecological cycle models of aquaculture in Xining city is shown in Figure 2.

Table 2. The comparison of typical ecological cycle patterns of farms in Xining

The company	Breeding scale	Input (ten thousand yuan)	Environmental benefits (ten thousand yuan)	Ecological cycle farming model	Suitable
A	50000	1500	50	Pig-marsh-electricity-organic fertilizer	Large-scale pig farm
B	More than 300,000 breeding chickens and 40 million chickens	700	40	Chicken-marsh-electricity-fly maggot protein	Large-scale chicken farm
C	10000	500	210	Livestock and poultry-marsh-fish-fruits and vegetables	Ecological breeding garden
D	15000	450	150	Pig-marsh-electricity-organic Fat-Fruits and Vegetables	Large-scale pig farm

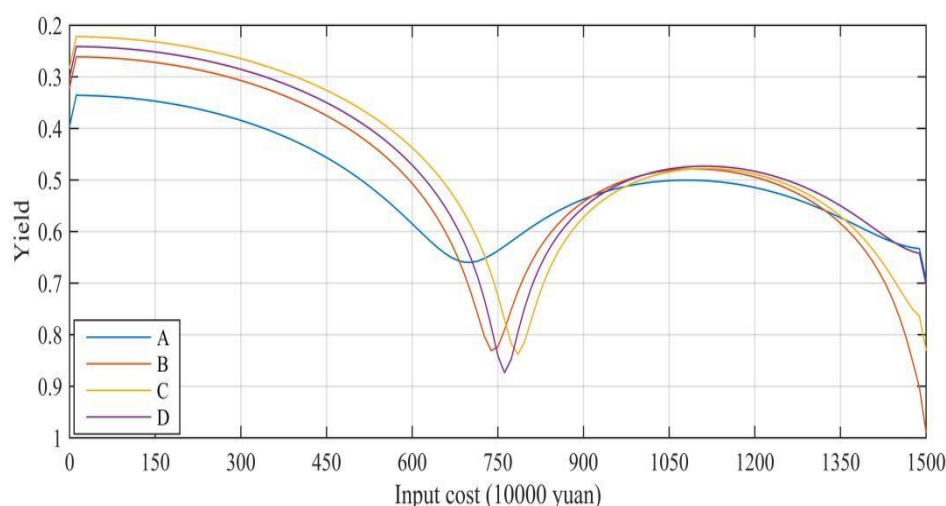


Figure 2. Comparative analysis of typical ecological cycle models of Xining aquaculture

For the utilization of agricultural waste, there are more and more ways to help agricultural production. Biogas can not only be used as high-quality fuel for staff canteen, but also can be used for heat preservation of pig house and chicken house, air column flame disinfection and harmless treatment incinerator in production process. Biogas generator can also be directly used for power generation in aquaculture production, which greatly saves the cost of aquaculture production, improves the environment of the farm, avoids environmental pollution, and is a good aquaculture cycle system. After the farm manure is pretreated, the concentrated manure solids are piled up and fermented into organic fertilizer. The wastewater enters the biogas digester for anaerobic fermentation, sedimentation tank, oxygen aeration tank for treatment, and aquatic plant oxidation pond for degradation, meeting the relevant pollutant discharge standards. This farming mode has the characteristics of energy saving and emission reduction. It has obvious economic, social and ecological benefits for animal husbandry to adopt the mode of ecological circulation breeding.

#### 4.3. An Analysis of the Influencing Factors of Herdsmen's Net Income

Regression analysis is carried out on the influencing factors of net income of herdsmen. The data of 60 herdsmen in the survey from 2018 to 2019 are taken for analysis. The regression analysis results of influencing factors of net income of herdsmen are shown in Figure 3.



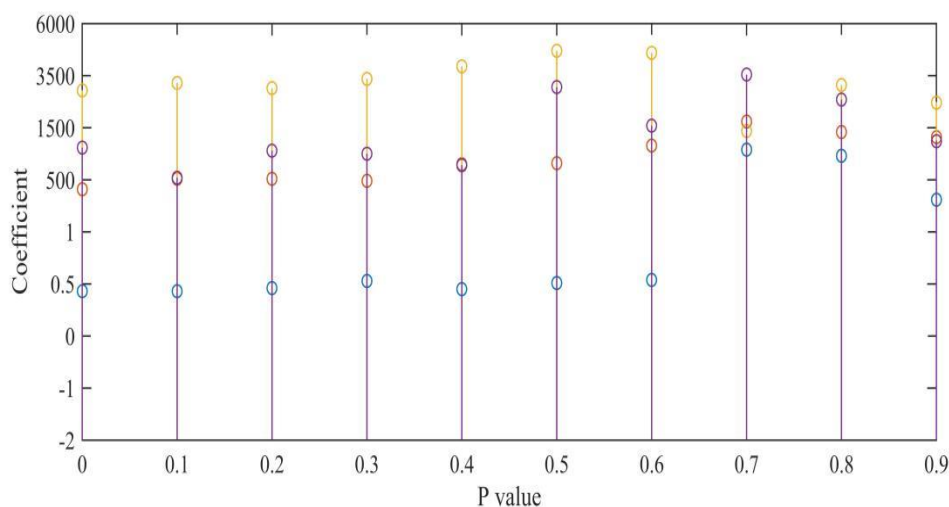


Figure 3. Results of regression analysis of factors affecting herders' net income

It can be seen that the smaller the p value is, the higher the significance degree is. It can be seen from the figure that the p value of forage purchase factor is significant, and from the positive correlation coefficient, forage purchase is positively correlated with the total income of herdsman's animal husbandry. In the process of analysis, the important factors affecting herdsman's animal husbandry income, such as labor force, grassland area, sheep quantity, feed purchase, etc., were analyzed. The panel regression method was used to test the positive correlation between the total income of animal husbandry and the purchase of pasture by herdsman. The purchase of pasture can increase the total income of herdsman, which is an important factor to promote the income growth of herdsman and the sustainable development of grassland economy.

#### 4.4. The Influence of Grassland "Three Changes" on Herdsman's Income and Expenditure

The "three modernizations" of grassland are worsening day by day, and the proportion of output value of animal husbandry in Xining city is significantly reduced. The comparative analysis of income and expenditure of herdsman in Xining city is shown in Figure 4.

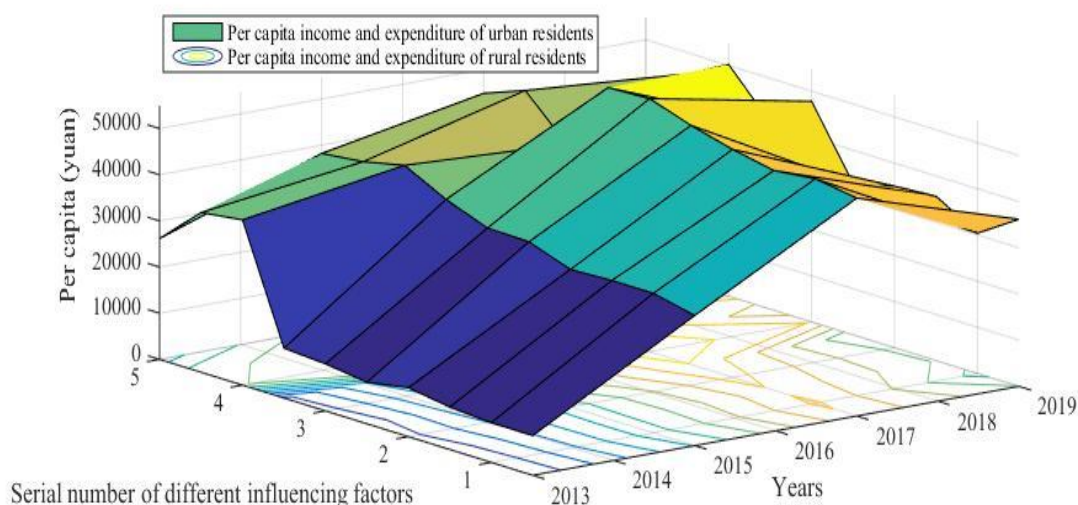


Figure 4. Comparative analysis of income and expenditure of herdsman in Xining city

Compared with the income of urban residents, the income of herdsmen is very low. Moreover, due to the remote geographical location, cold climate, single income, and increased cost of animal husbandry, especially after the implementation of the "balance system of grass and livestock", herdsmen actively reduce the number of livestock according to the maximum capacity scientifically approved. In addition, the construction of fenced grassland, livestock warm shed, introduction of improved breed livestock, etc. make the consumption expenditure of herdsmen more, almost equal to the income. Therefore, we should change the traditional extensive mode of production and management, pay attention to the synchronous development of development and utilization and ecological environment construction, realize the gradual transformation of intensive management mode of animal husbandry, promote the development of pastoral areas, and increase the income of herdsmen.

## 5. Conclusion

In the era of sustainable development, only by adhering to the concept of ecological construction and implementing the concept of sustainable development into all fields of economic construction and social development, can we properly deal with the relationship between economic development and environmental protection, get rid of the development mode of simply pursuing GDP growth, and avoid falling into the mistake of "economic development will inevitably bring environmental problems" and "environmental protection will inevitably hinder economic development" Zone. Only in this way can the coordinated development of economy, society and ecological environment be realized.

Through investigation, we found that Xining animal husbandry ecological recycling culture model has a good effect. It makes full use of the farm waste to produce biogas and power generation, recovers the water energy after treatment, separates the water dregs of biogas digester, and uses the biogas dregs to produce the compound fertilizer of vegetables and fruits, and so on. Therefore, for different types of aquaculture enterprises, it is necessary to design models, equipment and technology to meet the needs of aquaculture. Huizhou ecological recycling culture technology mainly uses biochemical technology, less involving thermochemical technology. Therefore, strengthening technology development and innovation, introducing advanced technology and providing effective technical training for managers are the guarantee for the smooth development and efficient operation of the animal husbandry ecological recycling breeding mode, so as to make the sustainable development of the animal husbandry region.

This paper analyzes the current situation of animal husbandry development in Xining from three aspects of economic development, ecological energy and social development. The former "three modernizations" are becoming more and more serious, and the grassland vegetation is reduced, so it is difficult to restore its regulating ability. It is necessary to establish a new development model as soon as possible, change contradictions reasonably and feasible, promote the virtuous cycle of animal husbandry, and promote the sustainable development of animal husbandry. In view of the existing problems, this paper puts forward some policy suggestions in order to contribute to the sustainable development of regional economy of animal husbandry in China.

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## Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this

study.

### Conflict of Interest

The author states that this article has no conflict of interest.

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