Research on Ecological Community Pattern and Ecological Carrying Capacity of Maqu Wetland Nature Reserve

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Abstract: In Maqu Wetland Nature Reserve, the traditional ecological research method and ecological footprint research technology are combined, and the main purpose is wetland conservation and sustainable utilization, and the methods such as combination of typical investigation and remote sensing data comparison, plant and animal research, biodiversity and regional wetland carrying capacity calculation and sustainable use of ecosystems are used to survey community patterns and genesis, and analyses community succession of Maqu wetland in recent 10 years to promote the conservation of biodiversity and realize sustainable development of Maqu wetland.

1. Introduction

After General Secretary Xi Jinping put forward the concept of "Green mountains and clear water are equal to mountains of gold and silver", it is more urgent to conduct in-depth research on wetlands and choose more scientific means to protect wetlands and achieve sustainable development to leave a splendid culture for future generations. The author carries on the research to the development of wetlands.

2. Overview and Research Methods of Research Areas in Recent Years

Overview of Maqu Wetland Nature Reserve

The statistics on national economic and social development of Maqu County from 2010 to 2014 were compiled, and comprehensive analysis was carried out from animal husbandry, industry, fixed asset investment, commerce, finance, cultural education and health, people's life and social security. From Table 1, we can see that by the end of 2014, the total permanent resident population was 701,800, of them the urban population was 203,300, an increase of 12,200. The urbanization rate was 28.97%, an increase of 1.58 percentage points over the previous year. The natural population growth rate was 7.88‰, an increase of 0.15 thousand points over the previous year; the birth rate was 14.96‰, an increase of 0.17 thousand points; the population mortality rate was 7.08‰, an increase of 0.02 points. The population of 0-14 years old is 145,900, accounting for 20.8% of the total population; the population of 15-64 years old is 510,400, accounting for 71.8% of the total population; the population of 65 years old and that of over 65 years old are 51,900, accounting for 7.4% of the total population.

On the whole, in 2009 to 2014, faced with the severe situation of slowing economic growth and increasing downward pressure, the people of all ethnic groups in the county, under the correct leadership of the county party committee and the county government, conscientiously implemented the spirit of the state and county economic work conferences and focused on work such as steady growth, restructuring, promoting reform, and benefiting people's livelihood to accelerate the transformation of economic development mode, and solve various problems and difficulties in economic operation through strengthening the macro-control of economic operation, so that the

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county's economy will develop steadily.

Table 1 Permanent Resident Population and Its Proportion at the End of 2014

Indicator	Quantity (10 thousand people)	Proportion (%)
permanent resident population	70.18	100.00
urban population	20.33	28.97
rural population	49.85	71.03
the population of 0-14 years old	14.59	20.79
the population of 15-64 years old	50.40	71.81
the population of 65 years old and that of over 65 years old	5.19	7.40

3. Methods for Studying the Ecological Community Pattern of the Maqu Wetland Nature Reserve

1) The ecological data are the sample data and remote sensing data accumulated by Lanzhou Institute of Animal Husbandry and Veterinary Medicine, Chinese Academy of Agricultural Sciences, in the investigation of grassland resources in south of Gansu in the past years.

2) The sample size was set to be 5 m *5 m for shrubs and 1 m *1 m for herbs with the combination of methods of sample and sample lines, typical and random. The sample size of the species in the sample was 50 cm *50 cm, ad it should leave the edge of the sample area more than 50 cm to avoid edge effect. The plant species, height, abundance, density and coverage of each sample area were calculated and measured, and each sample area was positioned by Gps. The community structure was analyzed by calculating the important value of species, niche breadth and species diversity in the sample plot, and the key species in the community were determined. The population source was determined by studying the community structure.

3) The taxonomy refers to the relevant taxonomic principles and methods of *Chinese Vegetation*. Twinspan method was used to study the community population pattern by quantitative classification of samples and DCA (Trend Correspondence Analysis) sorting, and study the community pattern by combining species richness.

4) Ecological footprint method.

4. Results and Analysis

The ecological carrying capacity of the Maqu Wetland Nature Reserve can be analyzed from local grain production and growth rate. Local food production will fluctuate because of different years and different climatic conditions, showing a dynamic trend that can be analyzed, so food production is a dynamic indicator for the local area, which can reflect the local climate characteristics. Specifically, the total value of grain yield of the Maqu Wetland Nature Reserve from 2009 to 2014 is ranging from 84,058 tons to 88,762 tons. In 2011, the grain output showed a significant decline, and in 2009, the grain output was the highest, but there was a relatively gentle upward trend in three consecutive years after 2011.

From the local food production and the combination of local conditions, a better turnaround trend can occur, possibly due to control of the local environment and safe production. The compliance rate of local residents' drinking water quality is 100%; the networking rate of air automatic station operation reaches 97.0%; the ambient air quality is tested for 365 days, and the 2014 data shows that excellent days are 341 days, excellent ratio is 93.4%; the annual average value of SO2 0.012mg/m3; the annual average value of NO2 is 0.013mg/m3; the annual average value of PM10 is 0.064mg/m3. The equivalent sound level of local environmental ranges from 40.7 to 70.5 decibels; the equivalent sound level of road traffic environment ranges from 57.9 to 74.8 decibels; the annual average temperature is 3.4 °C; and the annual total precipitation is 651.5 mm. Compared

with the indicators in 2011, the annual average value of total suspended particulate matter is 0.148 mg/m3; the annual average value of sulfur dioxide is 0.007 mg/m3; the annual average value of nitrogen dioxide is 0.007 mg/m3, and the number of days with good air is 332 days. The annual average value of environmental noise in the functional area of the city is 45.4 [dB(A)]; the annual average value of regional noise is 45.2 [dB(A)]; the annual average value of traffic trunk noise is 59.8 [dB(A)]. The values of various indicators in 2011 are within the control range, but the indicators have improved significantly since 2011.

In 2011, there were 82 accidents, 58 deaths, 74 injuries and 12.56 million direct economic losses with an increase of 9.755 million RMB compared with last year and an increase of 3.5 times. However, after the adjustment and improvement, 91 accidents occurred in 2014, with 60 deaths and 142 injuries, and a direct economic loss of 920,000 RMB. And there were no industrial and mining accidents, and no other production safety accidents occurred in industries such as construction and agricultural machinery. The total energy consumption is 556,200 tons of standard coal, an increase of 3.98% over the previous year. The value-added energy consumption of industrial units above the scale was 13.3 tons of standard coal per 10,000 RMB, declined by 3.4%. The energy consumption per 10,000 RMB of GDP is 0.559 tons of standard coal per 10,000 RMB, declined by 2.55%. In sum, it is in a state of steady development.

5. Conclusion

Maqu Wetland Nature Reserve covers an area of 5.6 million mu and is located near the Qinghai-Tibet Plateau. It is the kidney of the Yellow River. The current situation of the plateau water tower and the Yellow River water storage pool is favored by experts and scholars at home and abroad. However, in recent years, the problems of soil erosion and drought desertification have intensified. As a result, the wetland area of Maqu Wetland Nature Reserve has been seriously shrinking. The Maqu grassland adjacent to the wetland is the first natural high-quality pasture in Asia. They echo and complement each other. In order to achieve better development in the future, we should carry out two-way management of grasslands and wetlands, attach importance to scientific management means and monitoring measures, and moderately open industry with the combination of local reality, rationally graze, and achieve GDP growth and Engel coefficient growth in the perspective of sustainable development to further improve the ecological carrying capacity.

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