As the basis and material source of human production and life, land is an important part of natural resources. With the deepening of the concept of sustainable development, more and more attention has been paid to the sustainable development of land use. Reasonable assessment of land resources and environment is the premise of accelerating agricultural infrastructure construction, optimizing ecological environment construction, and rationally disposing land use structure. This paper proposes an evaluation method of rural land resources and environment based on the improved GIS system and takes Lingshan County as an example, based on the powerful spatial processing and rich spatial query and analysis capabilities of GIS, to analyze the current situation and sustainable development of its land use. It has established a representative and operable evaluation index system, which has certain reference significance for rural land and environmental evaluation.

1. Introduction

As the cornerstone of the existence and development of all things, land is the support for human beings to carry out various natural and social activities. Whether the use of land resources is sustainable is directly related to the sustainable and healthy development of human society [1]. The purpose of land change survey in China every year is to find out the current situation of land use and master the flow and direction of land resource use. Its ultimate purpose is also for the long-term sustainable development of land use. At this stage, due to the rapid economic development and the increasing urbanization process, the contradiction between population growth, economic development, and environmental protection, land resource utilization has gradually emerged. On the one hand, the rapid development of urbanization occupies a large number of valuable cultivated land resources in China; on the other hand, the contradiction between man and land has become increasingly prominent. The excessive development and unreasonable use of land have led to frequent problems such as land quality degradation and soil erosion. Therefore, the sustainable use of land resources is related to the sustainable and healthy development of human society and the survival of future generations.

Lingshan County is located in Qinzhou City in the south of Guangxi. Beibu Gulf Economic Zone, which is composed of Nanning, Beihai, Qinzhou, Fangchenggang, Yulin, and Chongzuo, is an important international regional economic cooperation zone in the southwest border of China’s coast [2]. Lingshan County is the hinterland of Beibu Gulf Economic Zone in China. With the continuous development of economic construction in Guangxi Beibu Gulf Economic Zone, it has caused great pressure on its ecological environment and land use. The main manifestations are as follows: the available land area is small, and the land use efficiency is low, and the contradiction between the land for economic investment projects and the land supply is increasing; the aggravation of human disturbance to the economic development zone has caused frequent problems such as vegetation damage, soil erosion, and the decline of cultivated land quality, which has worsened the already fragile ecosystem [3].

The study of this paper can enrich the theories related to the evaluation of rural land resources and environmental value and also provide references for practical policy making, which has rich theoretical and practical significance.
2. State of the Art

Since the mid-twentieth century, the rapid economic development of western countries has caused a series of contradictions between economic development and environment, which has been widely concerned by experts and scholars. In this context, the concept of sustainable development was first put forward in the book World Nature Conservation Strategy: Protection of Living Resources for Sustainable Development in 1980 [4]. Applying the concept of sustainable development to land use is the embodiment of the idea of sustainable land use.

For forest fire prevention, Bui et al. proposed and verified a new forest fire risk modeling intelligent method based on the imperialist competition algorithm (ICA) and related vector machine (RVM) hybrid model, using RVM to establish a prediction model to calculate the fire hazard probability, and using ICA to optimize the prediction ion model. Twelve Fire Factor Geographic Information System (GIS) databases were established to train and verify the mixed intelligence model. Through empirical analysis, the results show that the model has high performance; the AUC on the training and validation datasets is 0.842 and 0.793, respectively. And the proposed model performs better than two benchmarks, random forest and SVM [6]; Khalaysmaa et al. proposed an algorithm for the calculation of cascade hydropower stations. The algorithmic block diagram for implementing the simulation model and the implementation state calculation process is presented. Furthermore, an alternative scheme for integrating GIS monitoring data into computational algorithms is proposed [7]. When Asfaw and Yegizaw studied the impact of stormwater collection (RWH) on reducing the mid-season drought and drought, it uses multi-standard decision (MCDA) geographic information system (GIS) to identify the suitable sites for RWH, uses GIS and remote sensing space analysis to conduct pretreatment, operation, and analysis of appropriate site identification, and finally generates rainwater collection suitability maps [8]. In order to better plan urban construction land and improve the efficiency of urban land use, Chen using geographic information technology (GIS) revealed the coupling and coordination of urban construction land and geological environment, put forward reasonable urban land use plan, for our city planning layout, land use, disaster prevention, and mitigation, and provided a scientific basis [9]; Bahrami et al. in order to study the coastal areas of Morocco groundwater aquifer by the climate change, through geographic information system (GIS) technology, 58 samples of groundwater pollution level evaluation, evaluated the quality of water resources, i.e., nitrate from the irrigation of nitrogen used in agricultural activities [10]; James and Brophy to study how the living environment of adolescents in the ACTIVE program affects their physical activity, health, and motivation, they geocoded maps using QGIS2.18 and open source data for adolescent family, school, and environmental factors such as public transportation, active travel routes, and natural resources (e.g., green and blue space) and found that the school environment plays a key role in adolescent physical activity and motivation. That is, the distance to natural resources, indicating that access to green/blue spaces is important and that improving physical activity opportunities for adolescents in poor schools, particularly active transportation and access to natural resources, will be beneficial for cardiovascular health [11].

It can be seen that most scholars use analytic hierarchy process, entropy weight method, and other methods to carry out research. This paper makes empirical analysis by referring to the above methods.

In order to better accelerate the construction of agricultural infrastructure, optimize the ecological environment construction, rationally allocate the land use structure, and use the remote sensing satellite data to more easily evaluate the utilization of land resources, this paper proposes a rural land resource environment based on the improved GIS system. The schematic diagram of the value evaluation system is shown in Figure 1. Using the functions of BeiDou satellites and GIS satellites, combined with ground field workstations and land survey data from the Bureau of Geological Survey, a comprehensive assessment of rural land environmental resources is realized, which greatly improves the efficiency of the assessment.

3. Methodology

3.1. Land Resource. Land is the origin of all existence. There are Tusi and people, which accurately express the inseparable relationship between man and land. For the definition of land, different scholars have endowed land with rich connotation from different angles. In 1983, the dictionary of economics defined land as a complex natural complex composed of vegetation, landform, rock, soil, climate, and hydrology. Based on the definition of land in the dictionary of economics, the basic knowledge of land management published in 1992 also brings the results caused by human activities into the category of land. The concept of land as a natural complex is widely recognized by China’s academic circles, and on this basis, it is constantly endowed with new connotation [12]. Liu Liming believes that land has the dual attributes of natural geographical complex and natural economic complex. It includes the results of human transformation and utilization of land through various activities; Kong Xiangbin endowed land with the connotation of “land is landscape” from the perspective of landscape ecology [13]. Generally speaking, land has four attributes: nature, society, economy, and ecological environment.

The current situation of land use is related to the scientific management and dynamic monitoring of land resources and plays a prominent role in the Department of land and resources, as seen in Figure 2. According to different classification standards for the current situation of land use, it can be divided into primary land use structure and secondary land use structure. In addition, according to different land uses and spatial distribution, it can be divided into different types of functional areas, so as to more intuitively reflect the different uses of land use.

3.2. GIS Introduction. GIS is a spatial operating system. GIS can take the data of ordinary database for its own use and organically combine the map visualization function and geographic analysis function to visualize the data and carry out spatial analysis on the system. From the description of the Earth’s surface to the comprehensive data collection and management platform of GIS, it can be regarded as a dragon.
of data collection and management. The data stored in GIS includes scalar data, vector data, remote sensing image data, and attribute data. Different departments can analyze these data through the software platform of GIS, so as to achieve the corresponding objectives.

GIS integrates different disciplines such as surveying and mapping, environment, cartography, geography, informatics, management, and computer science. At present, GIS has developed into an independent discipline like computer science, which has been continuously developed by many scholars and frontline technicians. The purpose of developing GIS is to improve its function. The core meaning of GIS is analysis function. As a kind of information system, GIS has the relevant characteristics of information system. It can evolve and store the physical world in the form of information. GIS identifies objects with different attributes in a unified coordinate system, gives them different information, and then collects the world (seen in Figure 3).

The composition of GIS includes the following four aspects:

1. Hardware system
2. Software system
3. Data
4. People

By comparing the differences between GIS and other information systems, it can be judged that only GIS not only includes data and graph information, but also can deal with the topological relationship between data and graph. Data and data graphs, and images can be used for spatial analysis and decision-making. Natural resource asset audits require this capability. Strong integration and analysis ability of data and spatial elements is the basis of GIS application. Therefore, It can be seen that GIS is more suitable for the analysis of this paper.

4. Result Analysis and Discussion

4.1. Construction of Evaluation Index System. Sustainable evaluation of land use is to evaluate the suitability of land in a
certain time range, the extension of land use in time, and the
degree to which land resources meet human needs in a
specific time and range. Sustainable development includes
three aspects of ecological, social, and economic sustain-
ability. Among them, ecological sustainable development as
the basis cannot change for a long time, economic sus-
tainability as the prerequisite of sustainable development,
and social sustainability is the guarantee of sustainable
development [14]. Only when the three are met at the same
time can we truly achieve the sustainable use of land. The
evaluation index system is the key to the scientific and ef-
fefective evaluation of sustainable land use. Guangxi is located
in the mountainous area of southern China [15]. Its unique
karst landform, rich biological resources, and fragile eco-
logical environment make its ecosystem extremely sensitive.
Once the land cover is damaged, it will be difficult to recover,
which will affect the normal operation of the whole eco-
system. Therefore, the use of land in mountainous areas
should pay more attention to ecological and environmental
protection. At the same time, as an important coastal
economic growth area in China’s western development
strategy, the economic benefits of land use in Beibu Gulf
Economic Zone should not be loosened [16]. This paper will
take the ecological benefits of regional land use as the
starting point, take into account the evaluation of economic
and social benefits, and build a land sustainable use eval-
uation index system suitable for Lingshan County [17].

In the selection of evaluation index system, experts in
different fields have different emphases. Economists pay
more attention to economic benefits when selecting eval-
uation indicators, ecologists pay more attention to ecological
sustainability in the selection of indicators, and humanities
and sociologists pay more attention to the social accept-
ability of the current land use mode. According to the
different field conditions and natural conditions in the study
area, different regions have different emphases in the se-
lection of evaluation indicators.

Taking Lingshan County of Beibu Gulf Economic Zone
as the evaluation object, combined with the functional
characteristics of soil conservation, water conservation, and
biodiversity protection in the study area, and based on the
evaluation index system of sustainable land use proposed by
FAO, this paper constructs an evaluation system suitable for
the specific ecological functions of Lingshan County. The
system is composed of four levels: target level, criterion level,
subtarget level, and index level, from top to bottom. The
ultimate goal is to achieve sustainable land use, and eco-
omic, ecological, and social sustainability of land use is the
basic criterion to achieve this goal. Each basic criterion
contains multiple evaluation subobjectives, which are de-
termined by different evaluation indicators. The specific
framework of evaluation index system is shown in Figure 4.

4.2. Composition of Evaluation Index System. According
to the established evaluation index system framework, after
extensive access to data and combined with the current
situation of the study area, 20 evaluation indexes for eval-
uating the sustainable land use level of Lingshan County are
selected. The specific indexes are shown in Table 1.

Ecological sustainability is the basis of ensuring sus-
tainable land use, which is embodied in good ecological
environment, good farming conditions, and effective soil
pollution control. Among them, land vegetation cover can
effectively improve the environmental quality. A good
farming environment is helpful in preventing and con-
trolling soil erosion and improving the quality of cultivated
land [18]. The “three wastes” treatment rate of industrial and
mining enterprises is an important index to measure the
degree of soil pollution.

4.2.1. Good Ecological Environment Evaluation Index

(1) Forest Land Coverage. Forest land coverage refers to the
proportion of forest land area in the total land area. Forest
land is of great significance in protecting soil, maintaining
ecological environment stability, and biodiversity. The
higher the forest land coverage, the better the ecological
environment, and the stronger the ecological sustainability.
In this paper, the forest land coverage evaluation standard
Sustainable land use

Ecological sustainability
- Maintain a good environment
  - X1
- Improve the quality of cultivated land
  - X2
- Effective degradation control
  - X3

Economic sustainability
- High output efficiency
  - X4

Social sustainability
- Ensuring food security
  - X5
- Good relationship between man and land
  - X6

Total target layer
Criterion layer
Sub target layer
Criterion layer

Figure 4: Framework of evaluation index system.

<table>
<thead>
<tr>
<th>Target layer</th>
<th>Criterion layer</th>
<th>Subtarget layer</th>
<th>Index layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable land use</td>
<td>Ecological sustainability</td>
<td>Maintain a good environment</td>
<td>Forest land coverage (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Per capita public green space area (m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Terrace degree of slope land (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Farmland index above 25° (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land reclamation rate (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improve the quality of cultivated land</td>
<td>Standard rate of industrial waste gas emission (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Standard rate of industrial wastewater discharge (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Comprehensive utilization rate of industrial solid waste (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effective degradation control</td>
<td>Total economic output value per unit area (10000/HA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total agricultural output value per unit area (10000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Per capita disposable income of rural residents (yuan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Per capita disposable income of urban residents (yuan)</td>
</tr>
<tr>
<td></td>
<td>Economic sustainability</td>
<td>High output efficiency</td>
<td>Per capita GDP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Proportion of primary industry GDP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Proportion of GDP of tertiary industry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Grain per capita (kg/person)</td>
</tr>
<tr>
<td></td>
<td>Social sustainability</td>
<td>Ensuring food security</td>
<td>Multiple cropping index of cultivated land (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective irrigation rate (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good relationship between man and land</td>
<td>Per capita cultivated land area (MU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Population density (population/km²)</td>
</tr>
</tbody>
</table>

Table 1: Evaluation index system.
refers to the mountain 75% proposed by the forestry department as the evaluation target value.

Forest land coverage = forest land area/total land area.

(2) Per Capita Public Green Space Area. Public green space per capita refers to the amount of public green space per capita occupied by urban nonagricultural population. It is one of the indicators reflecting the living environment and quality of cities and towns. The higher the area of public green space per capita, the better the ecological environment. The standard value of public green space area per capita is determined according to the greening standard of ecological environment of international metropolis recommended by the World Health Organization. The public green space area is 20 m²/person.

Per capita public green space area = park green space area/county nonagricultural population.

4.2.2. Evaluation Index of Good Farming Environment

(1) Terrace Degree of Slope Land. For the classification of cultivated land gradient, there are five levels, ≤2°, 2°~6°, 6°~15°, 15°~25° and >25°. ≤2°, basically no water, and soil loss occurs. Mild, moderate, and high soil erosion can occur successively at 2°~6°, 6°~15°, and 15°~25°. The higher the grade of slope is, the more serious the water and soil loss is. The slope grade of cultivated land in mountainous areas is generally high. The cultivated land ≤2° is divided into flat cultivated land, and the cultivated land of 2°~25° is divided into terrace and slope land. The degree of terracing of slope land is the proportion of terrace and terrace in the cultivated land of 2°~25°. Terraced sloping land is conducive to the maintenance of water, soil, and fertilizer and the growth of forest land, grassland, and other vegetation. Therefore, the higher the degree of terraced sloping land is, the more stable the ecological environment is.

Terrorace degree of slope land = terrace and terrace area in cultivated land of 2°~25°/total area of cultivated land of 2°~5°.

(2) Farmland Index above 25°. The higher the slope level of cultivated land, the more likely it is to cause water and soil loss. The steep slope cultivated land with a slope level greater than 25° does not meet the farming conditions. According to the water and soil conservation law, it is not allowed to cultivate crops. If it has been reclaimed as cultivated land, it must be returned to forest and grassland. Therefore, the larger the cultivated land area above 25°, the more unstable the ecosystem.

Farmland index above 25° = cultivated land area above 25°/total cultivated land area of the county.

(3) Land Reclamation Rate. Land reclamation rate refers to the proportion of cultivated land in a certain area, reflecting the structure and degree of land use. Generally, the better the natural and socioeconomic conditions, the better the land quality, the higher the land use intensity, and the higher the land reclamation rate. Due to the uneven distribution of land resources suitable for agriculture and different land development history in China, the land reclamation rate varies greatly in different regions. In 2018, the average land reclamation rate in China was 14.05%.

Land reclamation rate = cultivated land area/total land area.

4.2.3. Evaluation Index of Land Degradation Control

(1) Treatment Rate of “Three Wastes” in Industrial and Mining Enterprises. The solid-liquid and gaseous wastes produced by industrial and mining enterprises contain many harmful substances. If they are not effectively treated and discharged into the environment, they will cause environmental pollution. The higher the treatment rate of industrial and mining “three wastes” in an area, the better the ecological environment, including the treatment rate of industrial wastewater, waste gas, and solid waste.

Treatment rate of “three wastes” in industrial and mining enterprises = recycling amount of “three wastes” in industrial and mining enterprises/overall emission amount of “three wastes” in industrial and mining enterprises.

4.3. Determination of Evaluation Index Weight. At present, scholars around the world use analytic hierarchy process, entropy weight method, Delphi method, and other methods to determine the weight of indicators. Considering the hierarchy of the evaluation index system of sustainable land use and the ecological characteristics of the study area, the weight value of the evaluation index was determined by AHP.

Analytic Hierarchy Process, abbreviated as AHP, refers to the decision-making method of qualitative and quantitative analysis based on the decomposition of the elements always related to decision making into objectives, criteria, schemes, and other levels. The analytic hierarchy process (AHP) considers the land system as a multilevel use system, finds out the factors affecting its sustainability and the relationship among them, organizes each factor into a hierarchical judgment matrix, and quantifies the importance of each index to the evaluation results in pairs. Finally, according to the principle of hierarchical synthesis, the weight index of each influencing factor to the overall evaluation goal is obtained [19]. The specific process of determining the weight of evaluation indicators is as follows:

4.3.1. Build a Hierarchical Structure. The complex problem is decomposed into a multilevel structure of target layer, criterion layer, and index layer. For achieving the goal, there are multiple criteria corresponding to each criterion, and multiple influencing factors included under each criterion are evaluation indicators. The overall objective, evaluation criteria layer, and impact index layer are combined to form a hierarchical structure.

4.3.2. Construct Pairwise Judgment Matrix. According to the subordinate relationship and relative importance between the elements of each layer, the corresponding relative
The value of $P_i$ Implications
1 $P_i$ is as important as $P_j$
2 $P_i$ is slightly more important than $P_j$
3 $P_i$ is significantly more important than $P_j$
4 $P_i$ is much more important than $P_j$
5 $P_i$ is much more important than $P_j$
6, 7, 8, 9... Intermediary values of two adjacent judgments

Reciprocal $P_{ij} = 1/P_{ji}$

Table 2: Value range of judgment matrix.

<table>
<thead>
<tr>
<th>$P$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>...</th>
<th>$P_n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>$P_{11}$</td>
<td>$P_{12}$</td>
<td>$P_{13}$</td>
<td>...</td>
<td>$P_{1n}$</td>
</tr>
<tr>
<td>$P_2$</td>
<td>$P_{21}$</td>
<td>$P_{22}$</td>
<td>$P_{23}$</td>
<td>...</td>
<td>$P_{2n}$</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>$P_n$</td>
<td>$P_{n1}$</td>
<td>$P_{n2}$</td>
<td>$P_{n3}$</td>
<td>...</td>
<td>$P_{nn}$</td>
</tr>
</tbody>
</table>

weight value of the matrix is given, and the value range is shown in Table 2. It is assumed that the upper factor $P$ and the lower factors $P_1$, $P_2$, ..., $P_n$ are interrelated, and the constructed matrix is shown in Table 3.

4.3.3. Hierarchical Single Sort. The maximum eigenvalue of the judgment matrix is calculated according to the weight of the evaluation index $\lambda$ Max and eigenvector $W$. The method is as follows:

1. The judgment matrix is normalized by column.
   
   $$ P_{ij} = \frac{P_{ij}}{\sum_{i=1}^{n} P_{ij}} $$
   
   (1)

2. The normalized matrix of each column will be aggregated by row.
   
   $$ W_{ij} = \sum_{j=1}^{m} P_{ij} $$
   
   (2)

3. Normalize the vectors summed by rows to obtain the eigenvector $W_i$.
   
   $$ W_i = \frac{W_{ii}}{\sum_{i=1}^{n} W_{ii}} $$
   
   (3)

4. Calculate the maximum eigenvalue of the judgment matrix.
   
   $$ \lambda_{\text{max}} = \frac{\sum_{i=1}^{n} \left( \sum_{j=1}^{m} P_{ij} \cdot W_{ij} \right)}{n \cdot W_j} $$
   
   (4)

4.3.4. Consistency Test of Judgment Matrix. In the judgment matrix, only when the judgment matrix is completely consistent, the elements in the eigenvector can be used as the weight of the evaluation index. The process of checking the consistency of judgment matrix is as follows:

1. Calculation of consistency index $CI$.
   
   $$ CI = \left( \lambda_{\text{max}} - n \right)/(n - 1) $$
   
   (5)

2. The random consistency CR of the judgment matrix is calculated according to the value of CI.
   
   $$ CR = \frac{CI}{RI} $$
   
   (6)

where RI is the random consistency index value of the matrix with the same order as $Ci$, and the value of RI is shown in Table 4.

4.3.5. Hierarchical Total Sorting. Combine the results of hierarchical single ranking, calculate the weight value of comprehensive indicators from top to bottom, and obtain the total weight of evaluation indicators. Assume that all criteria $A_1$, $A_2$, ..., are of level a, and the combined weight values of $A_M$ are $A_1$, $A_2$, $A_m$, factors $B_1$, $B_2$, ..., in level B corresponding to $A_j$, the single sorting results of $B_N$ are $b_{1j}$, $b_{2j}$, $b_{nj}$, and then the combination weight of layer a is calculated as the following matrix. If $b_{ij} = 0$, $B_j$ is independent of $A_j$, as seen in Table 5.

4.4. Standardized Transformation of Evaluation Indicators. The target value of each evaluation index in Lingshan County refers to the national, local, and other industrial standards, and the actual value and standard value of each index data are obtained according to the method of standardization of evaluation indexes in Section 2 of Chapter IV, as shown in Tables 6 to 11:

1. Build A-B layer matrix to judge the relative importance of land use sustainability target layer a, ecological sustainability criterion layer B1, economic sustainability criterion layer B2, and social sustainability criterion layer B3.
The b1-c layer matrix is constructed to judge the relative importance of various indicators affecting the ecological sustainability of land use.

(2) The b1-c layer matrix is constructed to judge the relative importance of various indicators affecting the ecological sustainability of land use.

(3) The B2-C layer matrix is constructed to judge the relative importance of various indicators affecting the economic sustainability of land use.
(4) Build b3-c layer matrix to judge the relative importance of various indicators affecting social sustainability of land use.

(5) According to the general ranking of levels, the weight of evaluation indexes at each level is calculated by reference, the weight value of each index relative to the overall goal is calculated, and the consistency test is carried out, and the weight table of land sustainable use evaluation indexes in Lingshan County is obtained.

4.5. Comprehensive Analysis of Land Resources. According to formula (7), the ecological, economic, and social sustainable level of land use in Lingshan County is calculated, respectively. Finally, the comprehensive calculation of land sustainable level is carried out to obtain the land sustainable level and comprehensive level of land sustainable use at all levels in Lingshan County, as shown in Table 12.

\[ P = \frac{\sum_{i=1}^{n} C_i \cdot F_i}{100} \] (7)

From the evaluation indexes, the forest land coverage rate of Lingshan County is 58%, far higher than the national average level of 22.93%, but there is still a certain gap from the standard of 75% forest land coverage rate in mountainous areas put forward by the Ministry of Forestry. There is 1257 hectares of farmland above 25° in the county, accounting for 1.9% of the total area of cultivated land in the county. The slope grade of cultivated land above 25° is high and does not meet the farming conditions, which is not conducive to the soil and water conservation and the stability of ecological environment in the region. It is necessary to gradually return farmland to forest and grassland; The county has 21701 hectares of sloping land (cultivated land above 2°), including 10398 hectares of terraced land, with a degree of terracing of 47%. Terracing of sloping land can effectively improve soil water storage capacity, improve soil quality, and prevent water and soil loss. The total area of cultivated land in the county is 65528 hectares, and the land reclamation rate is 18.7%, higher than the national average level of 14.05%. For the “three wastes” treatment rate of industrial and mining enterprises, the standard rate of industrial waste gas discharge is 80%, the standard rate of waste water discharge is 47%, and the comprehensive utilization rate of industrial solid waste is 69%. The pollution treatment level of industrial and mining enterprises is low, which is easy to cause environmental pollution and is not conducive to the sustainable utilization of land ecology in this area.

The economic sustainability evaluation of land use in Lingshan County selects the total economic output value of land per unit area, total agricultural output value per unit area, per capita disposable income of rural residents, per capita disposable income of urban residents, per capita GDP, and the proportion of primary and tertiary industries in GDP as the evaluation indicators. The economic sustainability of land has stepped from the initial stage of sustainable utilization to the stage of preliminary sustainable utilization.

The total economic output value per unit area of Lingshan County is 77000 yuan/ha, the total agricultural output value per unit area is 21600 yuan, and the per capita disposable income of urban and rural residents is 12802 yuan and 31467 yuan, respectively, all of which are slightly lower than the national average level. The regional per capita GDP is 22400 yuan, far behind the national average of 64520 yuan, driving down its economic development. The proportion of primary industry and tertiary industry in GDP was 25.69%, while that of Guangxi was about 15% and 45% in 2018. The proportion of primary industry was too high, which limited the development of tertiary industry.

4.6. Normality Test. Geostatistics theory requires that the samples studied need to meet the assumption of normal distribution, so it is necessary to test the normality of the collected data. This paper uses the geostatistics module of ArcGIS software to take the logarithm of the land price of the sample points and make a Q-Q plot to judge the distribution of the data [20]. Q-Q plot is a scatter chart composed of a series of point data. The abscissa of the figure comes from the statistical quantile of the sample data, while the ordinate
comes from the theoretical value of the statistical quantile of the normal distribution corresponding to the sample data. The fitting between the sample data and the normal distribution can be seen intuitively through the Q-Q plot diagram: if the scatter diagram drawn shows a straight line, it indicates that the original data has passed the normality test.

It can be seen from Figure 5 that, after the logarithmic transformation of the land price data of the sample, the sample point distribution of the Q-Q plot map is close to a straight line, indicating that the fitting degree between the data and the normal distribution is good, which can meet the requirements of geostatistical analysis.

5. Conclusion

According to the regional characteristics of Lingshan county with many mountains, little land, and fragile ecological environment, a set of representative and operable evaluation index systems was established based on the relevant theories of sustainable land development, which can provide reference for the evaluation of sustainable land use in other counties of Guangxi. This paper uses GIS data analysis, through the empirical analysis of Lingshan county land use sustainability evaluation, to further grasp the Lingshan county land ecological, economic, and social sustainability level. The results showed that, in 2018, the ecological sustainability of land use in Lingshan County was the strongest, followed by the economic sustainability, and the social sustainability was the lowest. The comprehensive sustainable land use in Lingshan County was in the preliminary sustainable stage. Through the analysis of Lingshan county land sustainable utilization obstacle, to determine the impact of sustainable land use and put forward the corresponding optimization measures, mainly including take some method to improve the quality of cultivated land, accelerate the construction of agricultural infrastructure, optimize the ecological environment construction, the rational allocation of land use structure, increase investment in capital and technology, and optimize the structure of land supply, five aspects of strengthening resource reserve and improving land supply ability were used.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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