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THE OPTIMAL ALLOCATION METHOD OF RESOURCES BASED ON THE CONSTRUCTION OF RURAL ECOLOGICAL CIVILIZATION

El método óptimo de asignación de recursos con base en la construcción de la civilización ecológica rural

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Key words: Rural ecology, evaluation indicators, resource allocation objectives, optimal allocation, grey correlation model, evaluation obstacle factors.

ABSTRACT

Owing to the low rate of utilization of traditional rural resources, it is impossible to allocate resources in areas with a complex agricultural structure. Therefore, this work designs a new method of resource allocation based on the construction of rural ecological civilization. In this work the optimal model of resource allocation under the construction of the rural ecological civilization is designed, the matrix of data of the evaluation index is established and the dimensionless processing is carried out. According to the gray correlation model, the degree of correlation of each evaluation index is calculated, and then the evaluation obstacle factors are calculated, to obtain the evaluation index of the optimal allocation of rural resources. On this basis, objectives of optimization of construction resources are achieved, the principles of optimization of resources are clarified, and finally the optimal allocation of resources based on the construction of rural ecological civilization is realized. The applicability of this method is verified by example analysis. The rate of utilization of rural resources under this method is high. When the regional structure is complex, it can also maintain a good resource allocation effect, demonstrating that research results are of practical importance.

Palabras clave: Ecología rural, indicadores de evaluación, objetivos de asignación de recursos, asignación óptima, modelo de correlación gris, evaluación de factores de trabas.

RESUMEN

Debido a la baja tasa de utilización de los recursos rurales tradicionales, es imposible asignar recursos en zonas con una estructura agrícola compleja. Por lo tanto, este trabajo diseña un nuevo método de asignación de recursos con base en la construcción de la civilización ecológica rural. En este trabajo se diseña el modelo óptimo de asignación de recursos bajo la construcción de la civilización ecológica rural, se establece la matriz de datos del índice de evaluación y se lleva a cabo el procesamiento adimensional. Según el modelo de correlación gris, se calcula el grado de correlación de cada índice de evaluación y luego se calculan los factores de obstáculo de la evaluación, para obtener el índice de evaluación de la asignación óptima de los recursos rurales. Sobre esta

base, se logran los objetivos de optimización de recursos de construcción, se aclaran los principios de optimización de recursos, y finalmente se realiza la asignación óptima de recursos con base en la construcción de la civilización ecológica rural. La aplicabilidad de este método se verifica mediante análisis de ejemplos. La tasa de utilización de los recursos rurales con arreglo a este método es elevada. Cuando la estructura regional es compleja, también se puede mantener un buen efecto de asignación de recursos, lo que demuestra que los resultados de la investigación tienen una importancia práctica.

INTRODUCTION

Rural ecological environment protection is the basis of agricultural health and national ecological security. With the advancement of industrialization and urbanization, the rural ecological environment has suffered serious damage, which has historical inevitability and human controllability (Ma et al. 2018). Since this century, the construction of ecological civilization, as one of the important strategic deployments of national development, has pointed out the development direction for rural construction. Combined with the national strategic deployment and the promotion process of the construction of the rule of law, the timely formulation of an effective institutional management system can provide a solid external guarantee for the construction of rural ecological civilization and realize the internal promotion of ecological civilization. However, at present, the construction of rural ecological civilization is still in its infancy., and the system construction is still in the field of sustainability (Niu et al. 2021).

In the process of China's economic development, agriculture is in a basic and pillar position. The optimal allocation and integration of agricultural resources is the main driving force of agricultural economic development (Cao 2020). China is a large agricultural country. There are many problems in the process of agricultural development, the most important of which is that the speed of agricultural development is relatively slow, accompanied by resource overutilization and environmental pollution (Chen et al. 2019). The existence of these problems has led to the stagnation and unsustainability of agricultural development. It can be seen that the development of China's agriculture must consider environmental resources and take the road of ecological civilization (Zhao et al. 2020). From the perspective of ecological civilization, agricultural resources have been optimized and integrated. Only by solving the imbalance, dispersion and liquidity of agricultural resources can we optimize the allocation of agricultural resources and provide possibilities for the integration of agricultural resources (An 2020). At the same time, it is necessary to integrate the concept of ecological civilization into the allocation and integration of agricultural resources to form a unified cultural tradition, national characteristics and management mode.

At present, China's rural demonstration villages are constantly emerging, the agricultural economy is developing steadily, and the living standards of farmers are improving, but there is an obvious imbalance in the development of the East and the West. In the eastern region, resources are centrally managed and idle resources are effectively developed and utilized (Xie et al. 2020). However, the continuous influx of farmers in the western region into cities or the eastern coastal areas to make a living has led to the unreasonable utilization of land resources, market resources and social resources, and the gap between urban and rural areas has further widened. Therefore, effectively integrating agricultural resources and promoting agricultural economic development is the only way to realize agricultural modernization. If the idle agricultural resources are optimized and re integrated, it will stimulate the development potential of agricultural economy, guide social resources, especially a large number of external resources, to flow to agriculture, and inject new vitality into the agricultural economy. Promoting the transformation and upgrading of the agricultural structure, promoting the rapid development of the rural social economy and achieving the interactive and balanced development of urban and rural areas are essential (Gao et al. 2020). At the same time, the integration of agricultural resources has changed the defects of scattered and low utilization of agricultural resources in the past, and made agricultural resources embark on the road of intensive development. Finally, the integration of agricultural resources will greatly change the problems of relatively backward agricultural development and limited growth of farmers' income, improve farmers' income, stabilize rural society, promote the development and prosperity of local culture, and contribute to the construction of a

socialist harmonious society. There are many research results on the allocation and integration of agricultural resources, but there is a lack of practical empirical problems. On the one hand, ecological civilization puts forward new goals for the allocation and integration of agricultural resources and points out the direction of agricultural development. On the other hand, whether the conditions for the allocation and integration of agricultural resources are mature, and how to allocate and integrate them, there are disputes and differences in the theoretical circle, and there is a lack of empirical material basis (Huang and Wang 2020).

In order to solve this problem, this paper designs a new resource allocation method based on rural ecological civilization construction, in order to further improve the resource allocation of rural ecological civilization construction (Wang et al. 2021c). According to the connotation of agricultural ecological civilization, agricultural spatial pattern and multi-level comprehensive evaluation index system, the evaluation index system of agricultural ecological civilization is established. According to the resource optimization objective of rural ecological civilization construction, the evaluation matrix is established. The linear dimensionless formula is used to deal with the evaluation index data of the optimal allocation level of resources under rural ecological civilization construction, as well, the contribution of utilization factors, index deviation and obstacle degree, diagnose the obstacle factors in the optimal allocation of resources, and the market mechanism is used to promote the rational allocation and intensive use of land.

METHODOLOGY

The optimal allocation method of resources based on the construction of rural ecological civilization

The model of optimal allocation of rural resources

The comprehensive management of rural ecological civilization construction involves aspects, such as production, life, and ecology. The traditional theory of relying on a single discipline and department management methods has been unable to achieve the new goal of optimal allocation of resources. Therefore, through the systematic analysis of agricultural resources in population, resources, environment and economic ecology, two mechanisms of system integration and system coordination are established (He 2020). Systematic and multidisciplinary understanding of regional ecological, economic and social characteristics is needed. Based on the above analysis, the resource optimal allocation model based on the construction of rural ecological civilization is shown in **figure 1**.

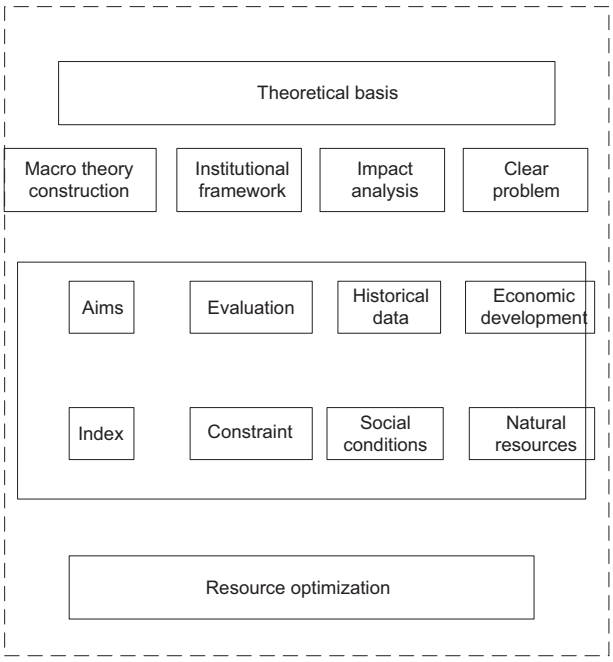


Fig. 1. Resource optimal allocation model based on rural ecological civilization construction.

Constructing the evaluation index of the optimal allocation of rural resources

Agriculture is a complex of natural reproduction and economic reproduction. The formation of agricultural spatial pattern is a gradual process with regional characteristics. At the same time, affected by natural and economic conditions and other factors. Different from the general analysis of regional agricultural resources and ecological environment conditions, this study focuses on analyzing the optimal allocation of resources in the construction of rural ecological civilization from the perspective of ecological development level (Wang 2021a). In this way, the paper evaluates the spatial pattern of China's agriculture from the perspective of ecological civilization; understands the overall situation of agricultural ecological civilization construction in various regions, and the differences between regions, and also evaluates the current situation and process of China's agricultural development (Yang 2021). Therefore, the guiding ideology of this study on the evaluation of agricultural spatial pattern is to grasp

the connotation of agricultural ecological civilization from the actual situation of China, and fully consider the supporting system of agricultural spatial pattern from the perspective of ecological civilization. It can not only reflect the status and level of agricultural ecological civilization construction in different regions, but also realize the convenience of practical operation and the availability of index data (Li et al. 2020a). The general idea of the assessment includes the following steps:

1) According to the connotation of agricultural ecological civilization, agricultural spatial pattern and multi-level comprehensive evaluation index system, the evaluation index system of agricultural ecological civilization is established.
2) The relative importance of each evaluation index for the construction of agricultural ecological civilization is determined, as well as the accurate weight of each level and index.
3) The foundation for the comprehensive calculation of the index is achieved by collecting and sorting out of the index data and the standardizing of the data.

The optimal allocation of resources in the construction of rural ecological civilization is the fundamental way to establish an environment-friendly economic development model and the inevitable requirement to realize the sustainable development of rural areas (Linh et al. 2019). The construction of rural ecological civilization provides a platform for the sustainable development of China (Zhao et al. 2021). The establishment of the evaluation index system for the optimal allocation of rural resources is of great strategic significance to promote the rapid, healthy and effective development of China's rural areas (Zheng and Chen 2022). It is very important to choose the evaluation index principle of rural resource optimization allocation. The purpose of rural ecological civilization construction is to promote the coordinated development of economy, countryside and environment. Meanwhile, it emphasizes the promotion of economic development capacity and the protection of resources and environment in the process of rural development. The index selection principle is the premise of establishing an effective and standardized evaluation index system for rural ecological civilization construction. The evaluation indexes selected in this paper mainly include the following aspects, as shown in **figure 2**.

While emphasizing economic development, protecting the ecological environment is also very important, and the importance of social construction cannot be ignored. The stable, coordinated and sustainable development of the three is the premise of the construction of rural ecological civilization (Wu et al. 2022). The purpose of establishing the evaluation index system of rural ecological civilization is to measure and evaluate the construction level of rural ecological civilization with quantitative methods, which is the basic step to realize the construction of ecological civilization (Chen 2022).

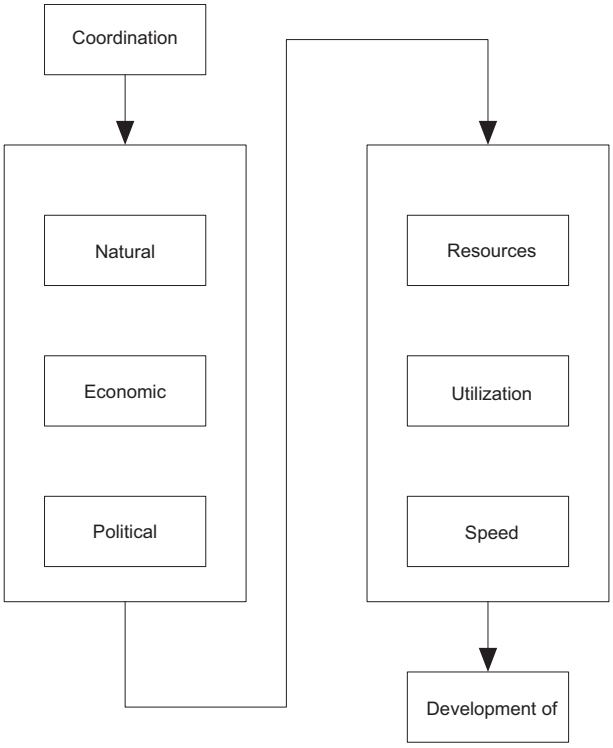


Fig. 2. Selection of principle indicators.

On the basis of determining the evaluation indicators, further screening of the evaluation indicators is necessary for the optimal allocation of resources. The evaluation indicator system of rural ecological civilization is a multi-indicator system, which has the characteristics of multi-level complexity. For the screening evaluation indicators, the grey correlation model is used to optimize resources, and the grey correlation is used to quantitatively analyze the correlation between features. The larger the correlation value, the closer the correlation between factors (Fu and Zhu 2021). The level of rural ecological civilization construction is affected by natural conditions, human activities and other factors. Assuming that the construction of rural ecological civilization is a grey system, this study uses the grey relational

analysis method to establish a grey relational model to evaluate the optimal allocation of resources. The specific steps are as follows:

1) Establishment of the evaluation index data matrix. According to the resource optimization object of rural ecological civilization construction, the evaluation matrix is:

$$D = X / \begin{bmatrix} X_{11} & X_{12} & \ldots & X_{1n} \\ X_{21} & X_{22} & \ldots & X_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ X_{n1} & X_{n2} & \ldots & X_{nn} \end{bmatrix} \quad (1)$$

Where, D represents the evaluation object and X represents the evaluation index.

2) Dimensionless processing. In order to eliminate the influence of the dimensional difference of each evaluation index on the diagnosis, a linear dimensionless formula is adopted to process the evaluation index data of the level of optimal allocation (Wang 2021b):

$$O = G / H * \frac{q}{c} \quad (2)$$

In the formula, O represents the original value of the evaluation index; G and H represent the positive index and negative index respectively; q/c represents the standard value of the evaluation index.

3) Calculus of the formula of correlation degree (Tong 2021):

$$r = \frac{s.t.\ (D_n)}{\sum_{j=1}^{1} Pc + b} \quad (3)$$

Where, r represents the degree of correlation; $\sum_{j=1}^{1} Pc + b$ represents the degree of correlation between the evaluation object and the optimal reference sequence; $s.t.\ (D_n)$ is the weight of the evaluation index.

4) On the basis of obtaining the correlation degree between the evaluation indexes, the paper calculates the obstacle factors that affect the level of rural ecological civilization construction, and provides decision-making reference for further improving the level of resource optimal allocation (Rohr et al. 2019). Factor contribution, index deviation and obstacle degree are used to diagnose the obstacle factors in the optimal allocation of resources, so as to calculate the influence degree of each index. The calculation formula is as follows:

$$B'' = \frac{r\,(v_n)}{D} \quad (4)$$

Where, B'' represents the impact degree of each evaluation index; r represents the correlation coefficient; v_n represents the evaluation coefficient of the nth evaluation object.

Establishment of the goal of optimal resource allocation

On the basis of constructing the evaluation index of optimal allocation of rural resources, clarifying the specific objectives is the main basis to measure the effect of resource allocation. With the promotion of urban construction group, the demand for land for various construction projects increase significantly. The huge demand for land has brought great pressure to the realization of the balance goal of rural land supply and cultivated land occupation and compensation (Wang 2021b). Market and administration are two mechanisms of mutual substitution and coordination in the allocation of land resources. Theory and practice have proved that the coordinated operation of reasonable government public policy and market mechanism is an important guarantee for the efficient use of urban land resources (Deng et al. 2020). Therefore, the goal of optimizing the allocation of resources for the construction of rural ecological civilization is established. The principle is shown in **figure 3**.

In the process of land resources allocation in market economy countries, the market is the most basic means. The market mechanism is used to promote the rational allocation and intensive use of land. The market allocates land resources through price mechanism and competition mechanism, and affects land allocation in two ways. First, different uses of land will generate profit differences, leading to differences in rent solvency, which will affect the choice of land use. Secondly, under the state monopoly of the primary market for land, the land price will affect the demand for land, thus affecting the allocation of land resources. However, when allocating land, a resource with diverse uses but limited supply, is limited to rely solely on the market mechanism, because there are certain influencing factors in agricultural ecology. The specific influencing factors are shown in **table I**.

Under the condition of market economy, whether the resource allocation of rural ecological civilization is balanced or not is reflected by the price mechanism, which is an indicator to adjust the market equilibrium.

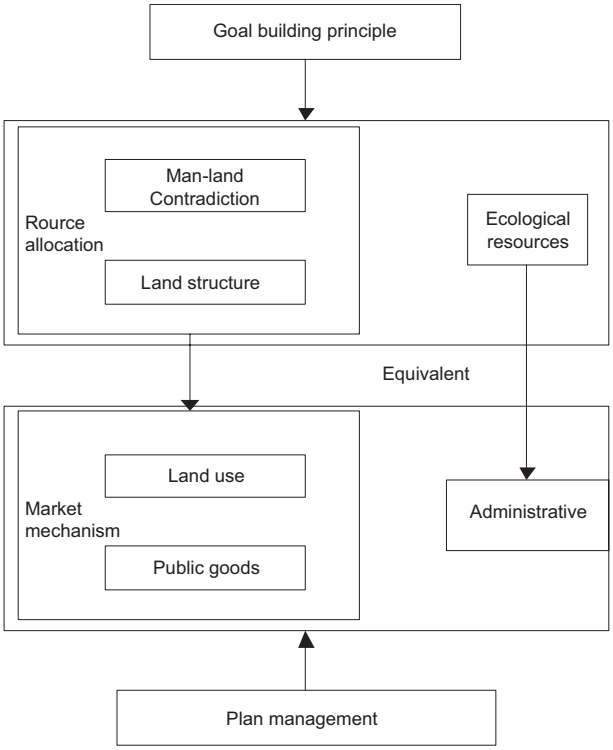


Fig. 3. Goal establishment principles.

TABLE I. PROBLEMS IN RESOURCE ALLOCATION IN THE CONSTRUCTION OF AGRICULTURAL ECOLOGICAL CIVILIZATION.

Serial number	Pollution source	Influences
1	Pesticide pollution	Affects human endocrine function and reproductive ability
2	Fertilizer pollution	Food safety and living environment of people
3	Mulch pollution	Affect farming
4	Township enterprises	Massive waste of raw materials and environmental pollution by waste
5	Domestic waste	Groundwater and surface
6	Groundwater and surface	Water pollution

The resource allocation of rural ecological civilization construction is different from the general commodity, and its price formation has its own law. Land, especially urban land, is both a resource and an asset, so the price of land is reflected in both the price of resources and the price of assets (Li 2020). However, in the specific economic activities of human beings, the properties of land are different. According to the theory of land income, land price is the capitalization of net land income, that is, land rent. The formula is (Teng 2020):

$$\beta = \frac{q}{s}[f/p] \tag{5}$$

Where, β stands for land price; q/s stands for net income from land; f stands for return recovery rate; p stands for earnings years.

In addition, under the condition of market economy, the resource allocation of rural ecological civilization construction is determined by the relationship between supply and demand, which is the most basic market relationship. Other economic variables can only indirectly affect the price by adjusting the resource allocation of rural ecological civilization construction (Fig. 4).

The growth of market economy supply and demand not only includes the increase of quantity, but also includes the increase of the quantity of certain land with the improvement of utilization efficiency, and the increase of the output of a certain area of land.

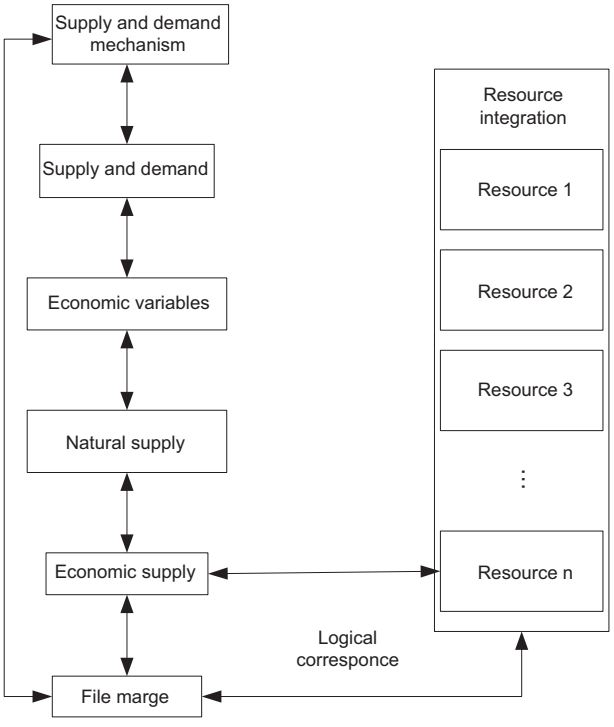


Fig. 4. Analysis of influencing factors of supply and demand mechanism.

The former is the direct increase of land economy supply and demand, while the latter is the indirect increase of land economy supply. The calculation formula is as follows:

$$\beta = \frac{q}{s}[f/p] \quad (6)$$

Where, m represents the growth of market supply and demand; q_i represents the single quantity of land supply and demand; a stands for the factors that affect the demand for arable land.

Several principles of optimal resource allocation

On the basis of the above indexes and objectives of optimal allocation of resources, the principles of resource optimization are established to realize the optimization of resources. Main principles are shown in **figure 5**.

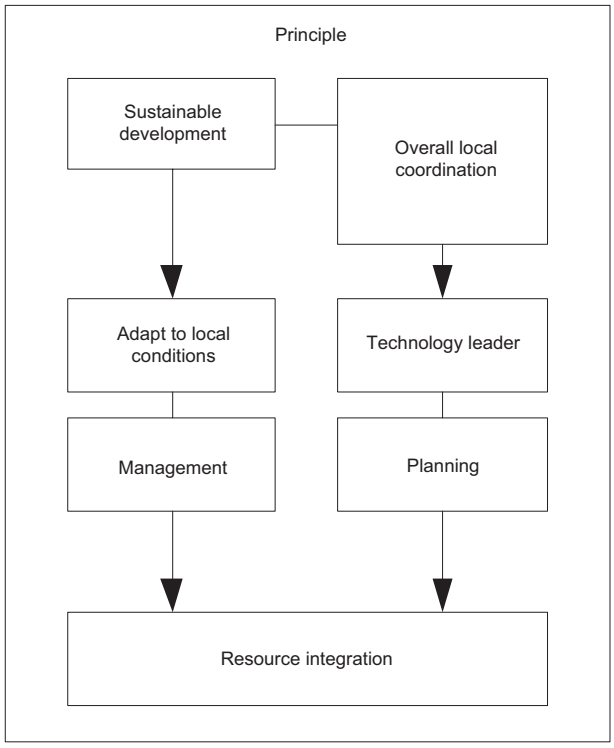


Fig. 5. Resource optimization principle based on rural ecological civilization construction.

Principle of sustainable development

From the perspective of ecological civilization, the allocation and integration of agricultural resources must adhere to the principle of sustainable development. The main contents are shown in **table II**.

TABLE II. CONTENTS OF SUSTAINABLE DEVELOPMENT PRINCIPLES.

Serial number	Index	Content
1	Stick to people	Focusing on agricultural economic development and improving people's living standards
2	Take agricultural production and ecological carrying capacity as the main line	The fundamental starting point and end point of agricultural resource integration and allocation
3	Correctly handle current and long-term interests in agricultural production	Relationship between vested interest and expected interest
4	Economic law	Coordination of production with agricultural resources
5	Ecological law	Maintain harmony between man and nature
6	Social law	Maintaining long-term dynamic balance in agro-ecosystems

Excessive development and utilization of agricultural resources will result in resource waste and even resource exhaustion, which will exceed the bearing range of ecological environment, reduce resource productivity and hinder sustainable development of agriculture.

The principle of harmony between the whole and the part)

The wholeness in this principle can be understood from two perspectives. First, the agricultural production system is a whole, like other systems, it has its own agricultural industrial structure; second, the internal agricultural industrial structure of each part, elements, and links are interrelated (Han et al. 2021).

The localization of the principle is mainly reflected in the participants. The agricultural development model or agricultural production system of different participants will be different. According to the distribution of agricultural resources, participants can be roughly divided into the following three levels. According to the principle of adjusting measures to local conditions, natural endowment is the main factor that affects agricultural production and de-

termines the direction and mode of agricultural development to a large extent. For example, from the coast to the interior of Fujian province, the distribution of topography, water resources and other natural resources is very different, and the choice of agricultural development direction and mode should also be different. There are many mountainous areas in the northwest of Fujian, which are suitable for planting tea, fruit trees and other crops. In addition, the coastal areas of Fujian, with vast sea areas, are suitable for developing marine aquaculture. The principle of adapting measures to local conditions requires that we proceed from reality, choose the mode most suitable for our own development, make full use of local comparative advantages, make the best use of everything, and give full play to the best production efficiency.

Science and technology guiding principle

In the process of agricultural resources integration and allocation, it is necessary to constantly promote the progress of agricultural scientific research, accelerate the construction of agricultural scientific research system, cultivate new varieties, develop new technologies, introduce new equipment, and improve the efficiency of agricultural production. In the process of constructing an agricultural development model and agricultural production system, we should make full use of effective analysis, simulation and decision-making means and technologies to develop and utilize agricultural resources in a sustainable way and realize sustainable development of agriculture. As China's Taiwan "delicate agriculture" mode and the successful experience of Shandong Binzhou "ecological agriculture" model, agricultural resource allocation and integration of the eastern Fujian province should adopt the concept of "ecological" as agricultural development, blend in "fine" the whole process of agricultural production, and adopt the regional and provincial "level" model to optimize the allocation of agricultural resources. According to the distribution of natural resources, human resources and economic development of rural resources, the allocation and integration planning of agricultural resources can be divided into two parts. The pattern of allocation and integration of agricultural resources at the provincial level is based on the pattern of allocation and integration of agricultural resources at the peasant household level and the pattern of allocation and integration of agricultural resources at the regional level, but it is different from them. Main steps are shown in **figure 6**:

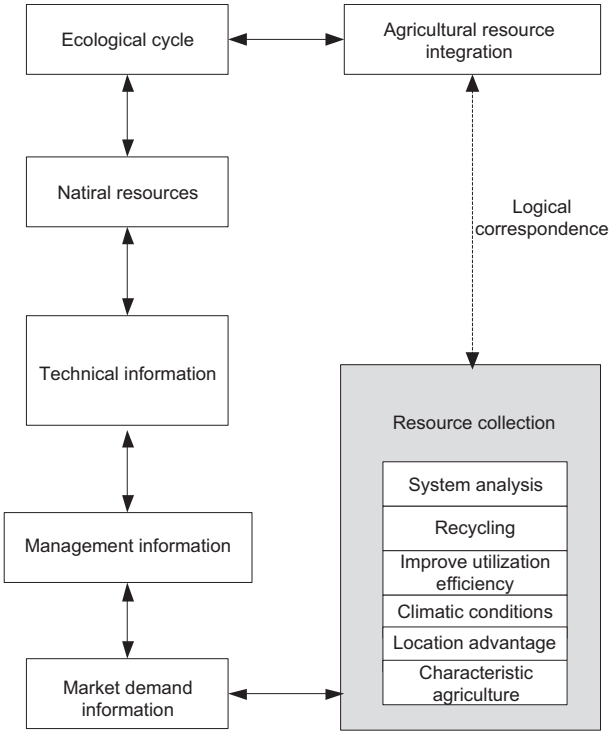


Fig. 6. Optimization steps for resource allocation.

The pattern of allocation and integration of agricultural resources at the provincial level is different from the other two models (see Table III for overall and local coordination). It cannot implement the allocation and integration of agricultural resources

TABLE III. OVERALL AND LOCAL COORDINATION.

Index	Content	Method
Indicator 1	Farm	Elements of the ecosystem
Indicator 2	Forest	Make clever use of the links between elements, parts, and links
Indicator 3	Herd	Organic connection
Indicator 4	Fish	Extending the agricultural industry chain
Indicator 5	Sideline	Establish the concept of big agriculture and big economy
Indicator 6	Importance	Promote the common development of various industries

into specific industries or regions, but rather provides development direction, goals and plans to guide the development of the other two models. From the perspective of ecological civilization, resource allocation should take the road of combining ecological recycling agriculture with characteristic agriculture, as shown in **Table IV**:

TABLE IV. RESOURCE ALLOCATION CONSOLIDATION PATTERN.

Serial number	Integrated content	Method
1	Agricultural natural resources	Integration
2	Technical information	Combine
3	Management information	System analysis
4	Market demand information	System analysis and judgment
5	Comprehensive analysis results	Production of market demand products
6	Sales from different distribution channels	Recycling of generated waste
7	Improve the efficiency of resource utilization	Realized ecological circular agriculture

This circular chain fully explains the concept of ecological civilization, improves the utilization efficiency of resources, realizes the ecological circular agriculture, and completes the optimized allocation of resources based on the construction of rural ecological civilization according to the above steps.

Experimental results and analysis

In order to verify the effectiveness of the optimized resource allocation method based on rural ecological civilization construction, an example is analyzed. The subjects were selected from a province in China with a total area of more than 160 000 square kilometers, a medium level of economic development, and a population of about 96 million residents. The data involved in the experiment were all from the provincial public database in 2019. In order to further verify the resource allocation advantages of the proposed method, the traditional method and the designed method were compared to compare the utilization of agricultural resources of the two methods. In this experiment, the traditional methods of the experimental control group selected the optimal allocation method of rural resources based on the change of rural land use proposed by Yi and Liu (2020) and the optimal allocation method of agricultural resources based on the impact of irrigation proposed by Wang and Xie (2020). Comparing the proposed method with the traditional method, the experimental results are more convincing.

There are many problems involved in the allocation of resources under the construction of rural ecological civilization, and the changes of the factors are obviously uncertain, such as the increase of population (Xu 2020), the yield of grain, the change of cultivated land area, the industrial policy and the labor force. The changes of these factors and factors have important influence on the allocation of regional resources. This experiment selects the evaluation index of resource utilization to compare the three methods. The economic definition of source utilization is within the scope of economics, which belongs to the category of macroeconomics: in the real society, labor unemployment, idle production equipment and natural resources are always in existence. This shows that the output indicated by the production possibilities frontier is only full employment or potential national income (Yu et al. 2020), while the actual national income is often less than it. It is necessary to explore the causes of this situation and propose improvement strategies to achieve full employment, make the actual national income close to or equal to the potential national income, and improve the utilization rate of resources. The higher level of resource utilization can directly reflect the degree of resource allocation in this region (Li et al. 2020b). The calculation formula of resource utilization is as follows:

$$X_m = \frac{\sum_{j=1}^{n} (d_j)s}{T_{time}} \tag{7}$$

Where, j represents the number of resource allocation regions in the region; d_j represents the resource utilization valuation of a single block; T_{time} represents the time span of the resource allocation process, and s represents the total number of people involved in resource allocation.

Agricultural natural resources in the experimental area mainly include cultivated land, water resources, forest, vegetation (Ye and Zhu 2020), grassland, mineral resources, climate resources, animal and plant resources and other natural resources. There are six areas to be configured in this area, as shown in **figure 7**.

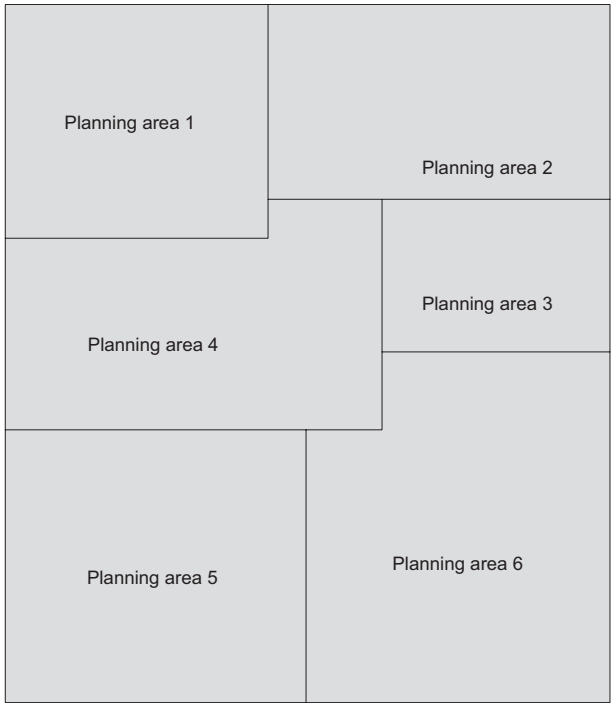


Fig. 7. Schematic diagram of regional planning of agricultural resources.

In the actual process of resource allocation and integration, the distribution of agricultural natural resources is unreasonable. The industrial structure information of this city is shown in **table V**:

As can be seen from the data in **table V**, some zones of the region are rich in resources, while others are poor in resources. Two traditional methods and the proposed method are used to allocate resources in this region, and the resource utilization ratio corresponding to each method is calculated. The experimental results are shown in **figure 8**.

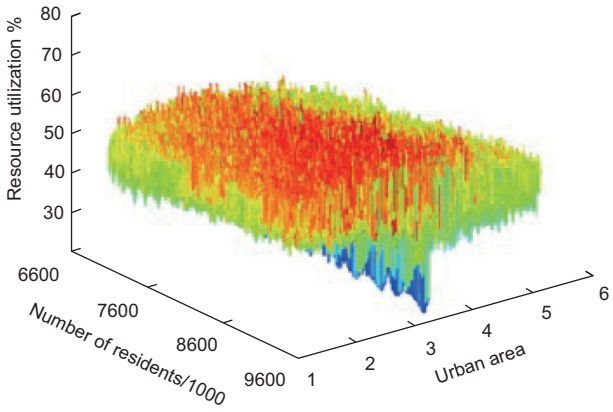
According to the experimental results in **figure 8**, it can be seen that the optimization method of rural resource allocation based on the change of rural land use has a large fluctuation range in the level of resource utilization. The resource utilization of the six regions tested in the experiment is also quite different. In zone 3, there is a minimum resource utilization of about 10%. Another traditional method is the optimal allocation of irrigation agricultural resources. The utilization value of rural resources under this method is relatively stable, and the utilization of agricultural resources in different regions is similar. However, the experimental results show that this method is only applicable to areas with no more than 80 million residents. When the number of residents exceeds 80 million, the utilization efficiency of agricultural resources is not ideal. Compared with traditional methods, the allocation method proposed in this paper can ensure that under the condition of large population and high utilization level of agricultural resources, the utilization of resources in rural areas is relatively balanced, which is conducive to improving the utilization level of rural resources, avoiding resource imbalance, and realizing the overall development of the province.

CONCLUSION

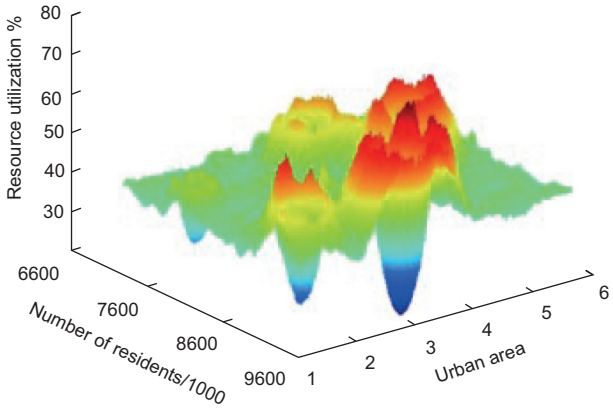
The allocation of rural resources is the key to promote the development of rural economy, and is of great significance to rural revitalization. In order to improve the effect of rural resource allocation, a new method of rural resource allocation was designed from the perspective of rural ecological civilization construction, and its effectiveness was tested. In the experiment, there are significant regional differences in the industrial development of the city. The total output of area 1 of the city is 226 325 billion yuan, which is 223 714 billion yuan less than that of area 6. The proportion of the primary industry is the highest in area 4, and the proportion of the tertiary industry is the highest in area 3, but its resource utilization rate is only 10%. Under the allocation of this method, with

TABLE V. INDUSTRIAL STRUCTURE INFORMATION OF CITIES.

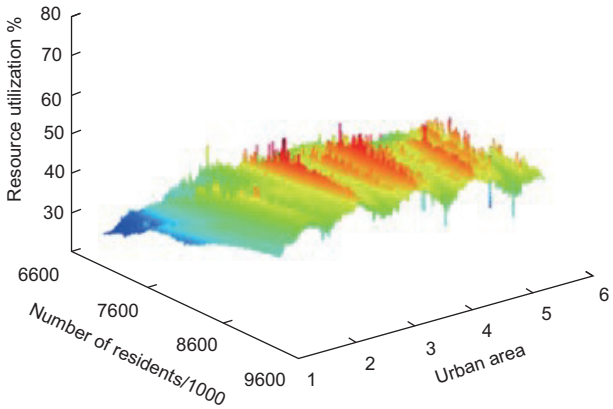
Urban area	Gross product/ 100 million	Proportion of primary industry /%	Proportion of the secondary industry /%	Tertiary industry proportion /%
Zone 1	2263.25	3.14	2.3	2.64
Zone 2	1426.33	2.32	2.15	1.63
Zone 3	1253.15	1.32	3.25	9.36
Zone 4	2214.33	14.32	4.32	6.32
Zone 5	3600.22	11.2	10.3	5.36
Zone 6	4500.39	23.21	11.5	9.24



(a) The proposed method



(b) Optimization method of rural resource allocation based on rural land use change



(c) Optimal allocation of agricultural resources based on irrigation effect

Fig. 8. Comparison of agricultural resource utilization under different methods.

the increase of the number of residents, the resource utilization rate of each region is about 70%, which is about 30% higher than the rural resource allocation optimization method based on rural land use change. At the same time, this method is more balanced in resource allocation and more stable in resource utilization. It can be seen that this method improves the stability of traditional rural resource allocation and resource utilization rate, significantly optimizes the effect of rural resource allocation, is conducive to activating the vitality of rural economy, promoting the transformation and upgrading of rural industries, and promoting the level of rural development.

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