A dynamic study on urban water resources and ecological recreation space in Ganjiang River Basin

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Abstract: This paper analyzes the ecological footprint of water resources in the ecological footprint theory of Ganjiang river basin by analyzing the ecological footprint of water resources, ecological carrying capacity, ecological profit and loss and ecological pressure. The ecological footprint of water pollution increases year by year and is the main cause of ecological environmental pollution. On this basis, it is proposed to strengthen the prevention and control of water pollution, improve the quality of urban ecological recreation space, increase the utilization rate of water resources, and shape a new model of high-quality ecological city.

1. General situation of Ganjiang river basin

Ganjiang river is the largest river in Jiangxi province, running southwesterly to the north of the Yangtze river and one of the eight tributaries of the Yangtze river. Ganjiang river basin according to administrative divisions in the province in Ganzhou, Gian, Pingxiang, at Fuzhou, Nanchang, Yichun, a total of seven districts in 47 counties and cities (districts), within the scope of planning land area of 80196 Km, cultivated land area of 19.6832 million mu, 2007 at the end of the total population of 20.6858 million people, the region's GDP totaled 269.546 billion yuan, accounted for 48.8% of the province's land area, 46.3% of the arable land area, 46.5% of the total population, 49.0% of the total cost of the production. Ganjiang river flow city is located in the subtropical monsoon climate zone, with four distinct seasons, mild climate and abundant sunshine. The annual average rainfall of Ganjiang river city is 15,76.6 mm, and the total amount of water resources is 70.289 billion m3. The average amount of water resources per capita is about 3398m3, and the average amount of water resources per mu is 3571m3. The spatial distribution of precipitation in the whole province is more in the south of Jiangxi province and less in the north of Jiangxi province, more in the east of Jiangxi province and less in the west of Jiangxi province.

2. Basic judgment of the relationship between urban water resources and ecological recreation space

All the cities in the world are resource-dependent cities, which cannot be formed without rivers and lakes. The shortage of water resources will seriously affect the natural ecosystem and seriously affect the social and economic development of the city. With the rapid pace of life, the distance between people and nature is gradually alienated, and urban residents are increasingly hungry for ecological recreation space. As the ecological infrastructure of the city, urban ecological recreation space, mainly urban parks and green Spaces, is an important guarantee for the sustainable development of the city. The utilization of water resources is closely related to the ecological environment. Water is the source of human survival, the important foundation of social and economic development, and the indispensable basic factor of ecological and natural environment. Ecological recreation space is an important part of urban ecological environment. City leisure space can effective water conservation, water seeping into the ground, the formation of air, plants, soil

even existed, adjusting underground water level, adjust the urban microclimate, gather the urban rainwater, ecological recreation space is urban green sponge, water conservation, reduce surface runoff, prevent flooding. Therefore, ecological recreation space is closely related to water resource use.

First, ecological recreation space is mainly composed of urban green space, urban park and urban wetland. Ecological recreation space originally plays a role in protecting water resources. Water quality is purified in the infiltration of urban green space, because urban green space plays a role in filtering water quality. Urban recreation Spaces protect vegetation, prevent soil erosion and increase biological diversity. Second, ecological wetlands protect rivers and lakes from pollution and purify water quality. Rational utilization of water resources can balance the ecological recreation space. Thirdly, the use of water resources within the appropriate carrying capacity, in order to improve people's life satisfaction, will not cause the local ecological environment deterioration, but also promote the socio-economic development of the region. Rational utilization of water resources can not only optimize the ecological environment, but also promote the social and economic development of people.

3. Analyze Results

3.1 Analysis of ecological footprint and ecological carrying capacity of water resources in Ganjiang river basin

The ecological footprint of water resources and its ecological carrying capacity of cities in Ganjiang river basin from 2003 to 2016 were calculated. First, from the perspective of the profit and loss of water resources, the ecological footprint of water resources was used within a reasonable range and the carrying capacity of water resources was abundant. Second, in the ecological footprint of fresh water, the ecological footprint of domestic water used the most water from 2003 to 2004, and the usage in 2005 was the smallest. In the later period, it increased year by year and remained stable in the later period. Third, in the industrial water footprint, the water consumption continues to increase with the increase of each year and remains stable after 2013. Fourth, in the ecological water footprint, the water consumption was the lowest in 2004, then continued to increase, the water consumption was the highest in 2009-2010, and then decreased and remained stable after 2011.

3.2 Analysis of ecological pressure and ecological profit and loss of urban water resources in Ganjiang river basin

To scientific to evaluate the gan river city water resources condition, according to the ecological pressure calculation formula for its ecological profit and loss of water resource, water resource ecological pressure, the per capita ecological carrying capacity of water resources, water resources per capita ecological footprint model to calculate, it is concluded that between 2003 and 2016 average water ecological pressure is 0.822, is in a state of ecological pressure is safe. According to the analysis of the ecological profit and loss of water resources and the ecological pressure of water resources, the ecological surplus of water resources in cities in ganjiang river basin indicates that the utilization of water resources is in the ecological sustainable state within it’s carrying capacity.

3.3 correlation analysis of urban water resources and ecological recreation space in Ganjiang river basin

First, the Hausman test value is negative for the impact of ecological footprint of water resources on green space coverage, indicating the failure of Hausman test. In this case, the fixed effect model is generally selected for analysis. According to the results of the fixed effect model, the ecological footprint of water resources has a significant positive impact on the green space coverage area.

Specifically, for every 1% increase in the ecological footprint of water resources, the green space coverage area increases by 0.32%, and the result is significant at the significance level of 5%.

Second, the ecological footprint of water resources on the impact of garden green area. The Hausman test value is 36.49, and the null hypothesis of random effect is rejected at the 5% significance level, so the fixed effect model should be selected. According to the results of the fixed effect model, the ecological footprint of water resources has a significant positive impact on the garden green space area. Specifically, for every 1% increase in the ecological footprint of water resources, the garden green space area increases by 0.33%, and the result is significant at the significance level of 5%.

Third, the ecological footprint of water resources on the park green area. The Hausman test value is 14.86, and the null hypothesis of random effect is rejected at the 5% significance level, so the fixed effect model should be selected. According to the results of fixed effect model, the ecological footprint of water resources has no significant influence on the green area of parks.

Based on the above test results, the ecological footprint of water resources has a positive impact on the green space coverage area and park green space area. The water use increased by 1% and the green space increased by 0.32%. The amount of water resource increased by 1%, and the area of garden green space increased by 0.33%. The increase of water resource usage will increase the urban green space and green space coverage area to ensure enough ecological recreation space.

4. Conclusion and Suggestion.

4.1 Save water for living and ecological environment, and build water-saving ecological city

The above analysis shows that although the ecological footprint of water resources in cities in the Ganjiang river basin is within the scope of water resources carrying capacity, because the Ganjiang river is near to abundant water resources, we still need to pay attention to the conservation of water resources and ecological water use. In particular, with the development of urbanization, the ecological footprint of water pollution is increasing, which leads to the worsening trend of urban ecological environment. It is urgent for us to further improve and strengthen the rational use of water resources, pay attention to water conservation and ecological and environmental protection. In the spatial layout of the future urban planning, water conservation is one of the main objectives of the new urban construction. Whether through the layout of land use and municipal facilities, the goal of building a green water-saving city should be achieved in advance.

4.2 Strengthen prevention and control of water pollution and improve the quality of urban ecological recreation space

The ecological footprint of water pollution in cities in Ganjiang river basin is increasing, which seriously damages the ecological environment of cities and may endanger people's health. One is to improve and change the water pollution in this area, improve water quality, improve the health of urban residents. Second, in the urban ecological environment, more ecological wetlands should be built to effectively enhance the self-purification of polluted water, improve the urban ecological environment and save water. The urban ecological recreation space, which is mainly composed of urban parks and green Spaces, is the urban ecological infrastructure. Ecological recreation space is the important guarantee to realize sustainable development, water resource usage increases, will increase urban ecological recreation space, on the one hand, provide people with ecology, entertainment, recreation, such as value, on the other hand, urban ecological protection of urban soil and water recreation space, nourishing water and purify the polluted water, maintain ecological diversity at the same time, reduce the urban heat island effect.

4.3 Improve the utilization rate of water resources and pay attention to the utilization of urban stormwater

From the ecological footprint of water resources, the agricultural and industrial water footprint increased to more than half of the total ecological footprint. In recent years, the footprint of fresh water resources is increasing, which reminds us to pay attention to the application of water-saving technology. At present, the ganjiang river basin's agricultural water use accounts for 42% of the total water use, among which the agricultural irrigation water is the most important one. At the same time, rain water is the most free water resources, natural rain water quality problems, microbial pollution concentration is low, with the development of the city, urban development of the hard pavement continues to increase, rainwater runoff changes, precipitation quickly gathered and exceeded the carrying capacity of urban water, resulting in urban water-logging, or even flooding. Then the collection and utilization of urban stormwater can not only alleviate the problem of urban water shortage, but also repair the urban ecological environment.

4.4 respect the ecological environment and develop symbiosis and coordination with water

In urban green space irrigation, attention must be paid to the design of water irrigation system. For example, flood irrigation method consumes a large amount of water, and fountains are relatively economical, but there is still a large space for water conservation. At the same time, we should pay attention to the selection of plant species, so that the rational use of water resources, the effective irrigation of ecological recreation space, wetland, urban green space, in fact, plays a role in protecting the city's natural water body, and can do the minimum damage to the natural ecological environment. In the city construction, we should pay attention to the balance with the natural ecological environment. Urban planning should have the consciousness of ecological environment protection and realize the construction of urban ecology. At the same time, we should pay attention to respect nature, in order to coexist with nature.

Based on the above analysis, urban water resources are highly correlated with ecological recreation space. In terms of the current growth mode of water use, the urban water use in Ganjiang river basin should continue to increase in the future, and the ecological footprint of water pollution should also continue to deteriorate with the development of cities. Therefore, we must pay attention to the ecological environment pollution, strengthen the prevention and control of water pollution, respect the natural ecological environment. To realize the balance between urban construction and ecological environment, the demand relationship between water resources and urban ecological recreation space is considered as a whole, and the urban space planning is analyzed. To improve the utilization efficiency of water resources and increase the livability of cities in Ganjiang river basin is more conducive to the development of urbanization. At the same time, we should pay attention to the protection of natural resources, so as to benefit from nature, benefit from nature.

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