Research on the Surrounding Environment of Large-scale Sports Events

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Abstract. Large-scale sports events, such as the Olympic Games, the Asian Games, and the World Championships, are an active act of demonstrating the image of social civilization through physical events. At present, China is advocating the construction of ecological civilization. In large-scale sports events, how to adhere to the core of “green sports”, protect and the surrounding environment, closely integrate sports events with ecological civilization construction, and explore the resumes of China’s sports events under the theory of environmental protection. The surrounding environmental protection system is of great significance. To this end, this paper establishes a quantitative evaluation model based on quantitative recursive analysis of ecological environment in sports events, taking urban air pollution index, green vegetation coverage rate and urban microclimate as factors to evaluate the environmental quality, combined with urban environmental climate. The ecological assessment indicators should establish a regression analysis and evaluation model, and dynamically adjust, using sample statistics and pollution index measurement methods to achieve a qualitative assessment of the impact of large-scale sports events on the surrounding environment, and propose a protection strategy.

1. Introduction
As a social and cultural phenomenon, sports has a great role in promoting social development. However, any human activity has a certain impact on the natural environment, as does sports, including recreational sports and competitive sports. Some large-scale sports events, such as the Summer and Winter Olympic Games held in countries around the world, as well as the World Championships of various events, are the epitome of the natural environment, social-economic and cultural development of the host country. In the process of hosting sports events, the government and the society pay more attention to the social effects and economic benefits brought by sports events. However, there are few concerns about the possible ecological environment impacts, and even artificial neglect [1]. It has separated the harmonious and unified economic, social and environmental benefits of sports events, which violates the inherent requirements of ecological civilization construction. Based on this, a quantitative evaluation model of large-scale sports events and urban ecological environment impact based on quantitative recursive analysis was proposed. The urban air pollution index, green vegetation coverage rate and urban microclimate were used as the evaluation parameters to establish an evaluation model. Descriptive statistical analysis and robustness test methods, analyze the city's large-scale sports events to improve the urban ecological environment and
destructive factors, thereby benefiting and avoiding harm, and promote urban ecological environment construction.

2. Parametric analysis and modelling of the correlation index between urban surrounding environment and large-scale sports events

2.1 Indicator determination

| Variable name                                    | Meaning of the variable                                                                                                                                 |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scale of sports events                           | The indicators such as the time of the large-scale sports events, the number of participants and the scale of the events determine the damage and damage of the event to the urban ecological environment. |
| Level of mass participation in sports events     | The higher the participation of the masses, the greater the risk of damage to the urban ecological environment.                                          |
| Government investment ratio                      | Local government's investment in holding large-scale sports events (unit: ¥10,000)                                                                       |
| Short-term environmental governance             | The level of investment in ecological environmental management before holding large-scale sports events                                             |
| Confidence Index for Ecological Environment Governance | The distribution of green vegetation based on urban ecological environment construction                                                               |
| Proportion of financial budget for ecological construction | The cost of holding a large-scale sports event - the cost of urban ecological management                                                                 |
| Urban forest coverage                            | Forest cover area of urban ecology in a microclimate environment / total area of urban land                                                             |

The criteria for selecting indicators are as follows. First, it reflects the principles of the three core elements of social, economic, and natural complex ecosystems [2]; Second, the regional and complex characteristics of the current sports events; and third, the evaluation of risk sources, which is triggered by sports events. The principle of the difference in cumulative source characteristics of environmental problems. Analyze the construction of 7 indicators. In analysing the impact of urban sports events on the urban ecological environment, it is also necessary to analyse the level of participation in sports events and the level of integration of the masses. Whether large-scale sports events are held by the city is attended by professional athletes or ordinary people. If professional athletes participate, more events are held in indoor venues. The ecological damage to the urban environment is mainly reflected in the disposal of garbage by the audience. If it is a mass participation project, it will mainly be represented as a city marathon. At this time, the masses will pay more attention to the nature of the ecological environment. Protection will be constructive to the ecological environment [3].

2.2 Empirical analysis

According to the above analysis of the constraints and explanatory variables of the urban ecological environment impact assessment, the urban air pollution index, green vegetation coverage rate and urban microclimate factors are used as the evaluation of the constraint parameters, combined with the large-scale sports events to hold the urban ecological microclimate environment [4]. Carry out regression analysis and dynamic balance adjustment of ecological assessment indicators, analyze the profitability indicators of the contribution of large-scale sports events to the ecological environment under different variables, and combine statistical regression analysis and auto-correlation feature
analysis methods to analyze different control indicators for urban ecology. The distribution of the relationship of environmental impact is shown in Figure 1.

![Figure 1](image1.png)

**Fig. 1** Correlation between the impacts of sports events held at different monitoring sites on urban ecological environment

Analysis of Figure 1 shows that the sports events held by different monitoring sites have a significant positive correlation with the impact of urban ecological environment [5]. By increasing the government investment in urban ecological governance, the contribution of large-scale sports events to the improvement of urban ecological environment is enhanced. Values, descriptive statistics are shown in Figure 2.

![Figure 2](image2.png)

**Fig. 2** Distribution of the contribution of large-scale sports events to the improvement of urban ecological environment
2.3 Regression analysis
The combination of sample statistics and environmental pollution index measurement is used to test the robustness. The results of the evaluation of the impact of large-scale sports events on urban ecological environment under different explanatory variables are shown in Figure 3. Analysis of Figure 3 shows that the impact of large-scale sports events on the urban ecological environment is Gamble and controllable, and the corresponding environmental governance measures can reduce the impact on the urban ecological environment.

![Regression Analysis Diagram](image)

**Fig. 3 Results of the impact of large-scale sports events on the urban ecological environment**

3. Enhance environmental protection measures around large-scale sports events

3.1 Improve legislation and improve environmental protection
Environmental protection is China's basic national policy. The state has enacted a series of laws, but the environmental protection laws and regulations on sports events have not been embodied, and some aspects are seriously lagging behind, even in a blank state. The lack of legislation will naturally affect the efficiency of law enforcement. In turn, the value of law-abiding is offset, and ultimately the result of illegality is unscrupulous [6]. At present, the organizers of large-scale sports events lack awareness of environmental protection, and they are prepared from the perspective of economic interests, in exchange for a balanced ecological environment in exchange for disproportionate economic benefits. Environmental pollution will become more and more serious. The relevant legislative organs in China should improve relevant laws and regulations, use laws and regulations to limit unscrupulous environmental damage activities, and promote the balanced development of environmental protection and economic benefits.

3.2 Ecological environment protection in the construction of the venue before the competition
The construction of venues before the big sports events is a basic work organized by the organization. The construction of the stadium is also a major window for the promotion of the city image of large-scale sports events. Solving the rational design of the stadium construction is the basis for the benign development of the urban ecological environment system. In the process of planning and constructing large-scale sports venues, the rational development and utilization of the land involves the planning
and transformation of the urban regional environment. When site selection, the nature reserve, water resources and animal protection areas should be avoided as much as possible. The developed land should be selected as abandoned or near abandoned industrial and commercial areas, combined with the city's regional cultural landscape to design the venue construction style, so that the construction style of large stadiums and the combination of urban ecological landscape protection and urban ecological landscape development it will be integrated with urban cultural style, natural landscape and ecological environment. In addition, in the construction of large-scale sports venues, we should try to use new environmentally-friendly materials, use modern scientific and technological achievements and new energy technologies to reduce energy waste and avoid secondary pollution of building materials.

3.3 Protection of urban air quality during the event
During the large-scale events, the influx of large numbers of migrants increased the density of the urban population, and the mobility of the population increased significantly, making transportation extremely busy, bringing heavy pressure to the transportation system. Car exhaust emissions far exceed normal, and the impact on air quality is self-evident. Therefore, it is imperative to strengthen the management of low-carbon and energy-saving public transportation network systems such as taxis and buses, and play a positive role in reducing the emission of toxic gases [7]. In addition, the regulation of private cars is also a very important part. During the competition, the restrictions of single and double numbers are carried out to enhance the public transportation capacity, especially the public transportation system leading to the competition venue. Strictly control the emission standards of vehicle exhaust, use the car in the competition, and advocate the use of energy-saving and environmentally-friendly vehicles. At the same time, we should not neglect the exhaustion of living and industrial waste, restricting the closure of the polluting factory government or restricting the production of lightly polluting factories, and the inability to treat and purify the exhaust gas after burning coal such as open-air barbecues and small workshops. Governance, minimize pollution of urban air. During the competition, the full implementation of air management programs to protect the purity of the air is the basic guarantee for the successful holding of sports events.

3.4 Realizing the sustainable development of green sports events
Objectively, an environmental assessment of a sporting event can achieve two goals. First, making institutional arrangements for the implementation and implementation of the “green concept” in sports events means that regardless of the type of sports events, ecological environmental protection should be considered and concerned in advance. Second, a “green review” of the whole process of sports events ensures the practical implementation of the “green” concept. Therefore, the environmental assessment boundary of sports events should be limited to the sports events themselves, and the specific content of the environmental assessment should comprehensively consider the nature, form, scale, time, duration, location, process and other factors of the sports events and the ecological environment of the region [8]. Correlation between factors such as status, environmental carrying capacity, and ecological resilience, and then whether to conclude whether the sporting event should be held, or how to modify the planning of sports events. At the same time, the environmental emergency plan for sports events and the responsibility for repairing afterwards should be clarified and reviewed. The essence of conducting environmental assessments on sports events is to incorporate the requirements of ecological civilization construction into the process of holding sports events, so that they can meet the needs of social and cultural life as well as the requirements of ecological civilization construction.

4. Conclusion
Considering that sports events are closely linked to environmental sustainability, more and more policy makers and event organizers are actively responsible for environmental protection, and encourage and require their members and partners to incorporate environmental protection into their
day-to-day management and long-term Mission planning. In addition, because sports events have great communication skills, psychological effects and attractiveness to young people, a well-designed sporting event can be an effective tool to promote global environmental sustainability.

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