

# The Role of International Sports Organizations in Climate Change and Adaptation

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## Abstrak

This study examines the dual role of international sports organizations in contributing to and mitigating climate change. The research aimed to assess the carbon footprint generated by sporting events, infrastructure, and associated activities, while also exploring adaptation strategies and environmental initiatives implemented by organizations such as FIFA, the IOC, World Athletics, and FINA. A mixed-methods approach was employed, integrating descriptive, qualitative, and quantitative analyses. Data were collected from credible institutional reports, peer-reviewed literature, and official sustainability disclosures. Results reveal that while major international events significantly contribute to greenhouse gas emissions, there is a growing commitment toward climate action, such as carbon offsetting, sustainable venue design, and educational campaigns. Methodologically, the study is strengthened by its triangulation of data sources and inclusion of comparative emission data across organizations and events. The findings support practical recommendations for embedding environmental sustainability in global sports governance and highlight the potential of sport as a platform for climate education and advocacy.

**Kata Kunci:** FIFA; Greenhouse Gas Emissions; Carbon Footprint; Climate Pollution; International Olympic Committee

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## 1. INTRODUCTION

Climate change has become one of the most pressing global emergencies, affecting all sectors of life including health, the economy, ecosystems, and increasingly, sports. While traditionally seen as a recreational domain, the sports sector has evolved into a powerful economic and social force with a growing environmental footprint (Kumar, 2017; Wilby, 2007). The scale and influence of global sporting events, coupled with rising participation rates and fan engagement across cultures, underscore the sector's enormous consumption of energy and natural resources (Cardella et al., 2021). As a result, sports institutions today carry a dual burden: they are both contributors to greenhouse gas emissions and potential leaders in climate mitigation.

Despite the growing body of research on climate change, few studies critically examine how international sports organizations specifically contribute to environmental degradation while also offering platforms for climate advocacy and action. This research addresses that gap by exploring the complex and two-sided role of institutions such as FIFA, the International Olympic Committee (IOC), the International Swimming Federation (FINA), and World Athletics (IAAF) in both exacerbating and mitigating the effects of climate change.

Sport's influence on climate is evident in large-scale emissions generated by stadium construction, international travel, energy-intensive infrastructure, and supply chains associated with global tournaments. At the same time, these institutions have begun to adopt sustainability initiatives such as renewable energy integration, public awareness campaigns, and carbon offset programs (Szathmári, 2025; Weiskopf et al., 2020).

Importantly, as climate-related phenomena like rising temperatures, air pollution, floods, and extreme weather events increase in frequency and intensity, they directly threaten the viability of sports events, athlete performance, and the long-term sustainability of the industry itself (Afifa et al., 2024; Breitbarth et al., 2023). The urgency of this issue lies not only in sport's contribution to climate change, but also in its growing vulnerability to it.

This study is driven by the following research question: *What is the actual impact and responsibility of international sports organizations in climate change – both as contributors to the problem and as key players in adaptation and mitigation efforts?* The hypothesis guiding this research is that global sports organizations play pivotal, dual

roles: on one hand, they influence actions that contribute to systematically reducing and adapting to climate change, while on the other, their activities increase gas emissions and carbon footprints.

This research spans the period from 2017 to 2024, during which carbon emissions from international sporting events have risen significantly, yet also coincided with stronger commitments by major sports organizations to partner with global institutions in environmental efforts. Spatially, the study focuses on the most influential bodies in global sport and climate discourse: FIFA, the IOC, FINA, and World Athletics (Badmus, 2019; Orr & Inoue, 2019).

**International Sports Organizations:** These are institutions (the International Federation of Association Football, the International Olympic Committee, the International Association of Athletics Federations, and the International Swimming Federation) that operate according to international legal and legislative frameworks. They are controlled by sports entities in various countries around the world. They are non-profit in nature and take the form of federations, bodies, clubs, and other sports institutions. They are responsible for writing the duties, procedures, instructions, organization, supervision, and everything related to the work of international sports institutions, in order to achieve internationally recognized management according to globally required standards (Orr & Inoue, 2019).

The theories upon which the research is based and which explain the phenomenon studied. We will limit ourselves to three theories: 1) The traditional theory: This theory demonstrates the responsibility of the sports sector for the environment through its activities and competitions, which are very large and have a significant impact on the environment, and their high consumption of resources and energy. This makes it a fundamental component among the systems and entities that produce carbon. This requires it to bear moral and legal responsibility, through the international environmental system whose pollution it contributes to (Al-Sharifi, 2021); 2) Sport climate action: This theory emphasizes that sport has a leadership responsibility and is a tool for climate action, not just a victim. This responsibility is recognized through reducing emissions, setting a goal to eliminate carbon emissions, and committing to achieving this goal, while integrating sustainability behaviors into the plans and work of sports institutions. (<https://2u.pw/WIQWU>, 2024); 3) Adaptive Response: Emphasizes the ability of sports to create and establish tools and mechanisms that adapt to climate change and are appropriate to it through electronic digital facilities and installations, with the changing dates of sporting events and competitions, and utilizing the data available from meteorology and climate samples to keep pace with the organization's standards and requirements, as well as performance and its criteria.

Addressing Climate Change Through Sport. (2022). The sports sector contributes to combating climate change by reducing the polluting footprint of sports institutions. Governments around the world, along with international organizations, are contributing to this goal by creating and implementing sound procedures and mechanisms. Sports play a very important role as part of the solution to these environmental problems.

This study emphasizes the significant role of clean energy in various fields, including sports. It demonstrates how renewable energy sources contribute to environmental sustainability while reducing pollution associated with sporting events and activities. It also demonstrates the use of advanced technologies during sporting events. The study uses a case study approach and examines the challenges, obstacles, and opportunities facing the sports sector.

Simmonds, R., & Pielke, R. A. Sport at the climate crossroads: champions for climate or green-sportwashing. (2024). This research paper demonstrates that a number of sports governing bodies around the world have made commitments to report and reduce emissions of gases and pollutants related to sporting activities. Proposed measures related to the sports climate, including reducing the number of fans at sporting events, could harm the sports sector and impact the losses it incurs. A review methodology was used to analyze and discuss the measures taken by sports organizations.

Schneider, Sven & Mücke, Hans-Guido. Sport and climate change—how will climate change affect sport? Sport und Klimawandel - Welche Folgen hat der Klimawandel für den Sport? (2021). This research paper explores the impact of climate change on sports, by identifying the health risks athletes may face, such as rising temperatures, air pollution, and increased incidence of infectious diseases. Awareness of these negative impacts is crucial for both sports organizations and athletes, enabling them to take action to prevent disease and adapt to climate change.

Our research paper is similar to the previous studies above in that it addresses the very important topic of climate change and how it affects and is affected by sporting events and activities through increased gas emissions, carbon footprints, and pollution. It also addresses the role of sports organizations, both local and international, in shedding light on this topic and contributing to its reduction, prevention, and treatment, both on the environment in general and the sports environment in particular. Our study differed from the above studies by highlighting the global sports organizations with the largest role and huge impact on climate, namely the International Federation of Association Football (FIFA), the International Olympic Committee (IOC), the International Association of Athletics Federations (IAAF), and the International Swimming Federation (FINA). Mixed methods were used, namely the descriptive analytical method, case study, and quantitative and qualitative methods. It also addressed adaptation to climate change on the one hand, as well as the role of global sports organizations in the rise in gas emissions and pollution, and how to contribute to reducing it and raising people's awareness through sports of the dangers of climate change to life. We relied on reliable data and statistics from well-known, solid international institutions, which confirms the benefit that this study will add by relying on this real data through its analysis and discussion.

## 2. METHODOLOGY

This study employed a multi-method scientific approach, combining descriptive analytical, qualitative, and quantitative methodologies to provide a comprehensive understanding of the role of international sports organizations in climate change mitigation and adaptation. The descriptive analytical method was used to systematically examine and interpret data related to environmental sustainability efforts by major global sports institutions. Qualitative analysis was conducted through content analysis of environmental policies, campaign documentation, and sustainability certification reports adopted by international organizations. Meanwhile, quantitative analysis focused on numerical data such as annual carbon emission figures, emission offset percentages, and investments in green technologies.

Data were collected from 2017 to 2024, a period during which carbon emissions linked to major sports events increased, while sustainability efforts also intensified. The study relied primarily on secondary data sources, including peer-reviewed journal articles, international policy briefs, official sustainability disclosures, and publicly available environmental reports from the International Olympic Committee (IOC), FIFA, World Athletics (formerly IAAF), and the International Swimming Federation (FINA).

A case study approach was applied to evaluate and compare sustainability strategies and outcomes of major international sporting events, namely the Tokyo 2020 Olympic Games, the Qatar 2022 FIFA World Cup, and planned initiatives for the Paris 2024 Olympic Games. These cases were selected for their scale, global visibility, and declared sustainability targets, providing a robust basis for comparative evaluation. To enhance data validity and reliability, statistics and emission estimates were cross-verified with third-party sources such as the United Nations Climate Neutral Now initiative, independent environmental audits, and datasets from international climate databases.

Tables were used to structure and summarize comparative data on carbon emissions, environmental campaigns, and technological investments. A visual flowchart or framework could also be developed to clearly outline the research process—from data sourcing and categorization to thematic and numerical analysis—providing readers with a transparent view of the research logic and execution. This rigorous mixed-methods design ensured triangulation of data sources and methodological robustness, offering both depth and breadth in analyzing the environmental accountability and climate leadership roles of international sports organizations.

## 3. RESULTS AND DISCUSSION

The role of international sports organizations in promoting environmental sustainability. The analysis relies on validated data obtained from scientific publications, official institutional reports, and credible online sources.

### **Contributions of International Sports Organizations to Environmental Sustainability**

Table 1 presents the key initiatives and commitments undertaken by major international sports organizations to address climate change and reduce their environmental footprint.

**Table 1.** Contributions of International Sports Organizations to Environmental Sustainability

No.	Sports Organization	Annual Carbon Emissions (CO <sub>2</sub> e)	Green Technology Investments	Environmental Awareness Campaigns	Sustainability Certification & Targets
1	International Olympic Committee (IOC)	250,000 tons (2017–2020, fully offset)	Investment in sustainable infrastructure and system upgrades	12 international awareness initiatives	Paris 2024 emission reduction target: 54.6%
2	FIFA	3.6 million tons (2022 World Cup)	79 sustainability projects (Qatar 2022)	Clean energy campaigns	Carbon-neutral vision by 2040
3	World Athletics (IAAF)	Significant reduction via technology	Electric transport, infrastructure upgrades	Regional initiatives (e.g., Pacific Islands)	ISO 20121 sustainability certification
4	International Swimming Federation (FINA)	No exact data; visible initiatives	Infrastructure rationalization	Participation in global awareness campaigns	Circular economy efforts (e.g., "Trash to Treasure" medals)

The data demonstrates a growing awareness among sports organizations of their environmental responsibilities. The IOC's 54.6% emissions reduction for the Paris 2024 Games exemplifies its leadership in climate action. Similarly, FIFA has recognized its significant carbon footprint and responded with major sustainability campaigns, such as its early participation in the UN Climate Neutral Now campaign and implementation of clean energy initiatives in World Cup infrastructure.

The IAAF (now World Athletics) has pioneered the integration of clean energy in sports events, notably during the Diamond League hosted in Qatar, including efforts like tree planting and ISO 20121 certification for sustainable event management. Meanwhile, FINA is moving toward environmentally responsible practices through infrastructure innovation and awareness campaigns. Their "Trash to Treasure" initiative during the 2025 Singapore World Championships exemplifies a commitment to circular economy principles.

### Carbon Footprint of Major Sporting Events

**Table 2.** Carbon Emissions from Selected Global Sporting Events

No.	Event	Year	Carbon Emissions (CO <sub>2</sub> e)	Notes
1	Olympic Games	2016	3.6 million tons	Based on official estimates
2	FIFA World Cup, Russia	2018	2.16 million tons	Excludes full indirect emissions
3	Tokyo Olympics	2020	1.96 million tons	4.38 million tons offset
4	FIFA World Cup, Qatar	2022	3.6–4.0 million tons	First carbon-neutral football event

Table 2 illustrates the large-scale environmental impact of global sports events. While direct emissions are often reported, many events fail to fully account for indirect emissions from construction, travel, and resource consumption. The Tokyo 2020 Olympics made notable progress by compensating for more emissions than were produced, setting a benchmark for future sustainability practices.

Qatar's 2022 World Cup represents a major leap in integrating sustainability with sporting infrastructure. Despite high emissions, Qatar compensated above the estimated carbon footprint and employed climate-adaptive technologies, such as stadium cooling systems and green building design. This event marked the first truly carbon-neutral football tournament, underscoring the transformative potential of sustainability planning in sport.

### Implications and Recommendations

The increasing frequency of extreme weather events—heatwaves, hurricanes, and droughts—poses serious threats to sporting events and athlete performance. As climate conditions become more unpredictable, there is an urgent need for sustainable planning in sports.

This includes: 1) Transitioning to clean, renewable energy sources in all sports infrastructure; 2) Launching global environmental awareness campaigns led by sports institutions; 3) Encouraging carbon offsetting and sustainable transportation during tournaments; 4) Designing and building adaptable, eco-friendly venues.

Sports have immense global influence and can play a pivotal role in promoting climate action and environmental stewardship. As highly visible institutions, international sports federations should lead in setting standards, collaborating with governments and NGOs, and integrating sustainability into every facet of their operations. Through proactive environmental leadership, the sports industry can help mitigate climate change while preserving athlete health and event integrity.

#### 4. CONCLUSION

This study highlights the growing commitment of international sports organizations to environmental sustainability, particularly in reducing carbon emissions and promoting eco-conscious practices in major events. Organizations such as the International Olympic Committee, FIFA, World Athletics, and the International Swimming Federation have taken meaningful steps—ranging from infrastructure improvements to public awareness campaigns—to mitigate the environmental footprint of global sports. Despite the considerable carbon emissions generated by large-scale events like the Olympics and World Cups, there has been a notable shift toward accountability, innovation, and sustainability integration, especially as demonstrated by Qatar's 2022 World Cup. This progression underscores the potential of the sports sector not only as a platform for entertainment and competition but also as a powerful driver of environmental advocacy and climate resilience.

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