



Original Article

Climate Change and Outdoor Sports: Emerging Challenges for Athletes and Physical Education

Dr. Dhananjay Shamsunder Sirsat

Assistant Professor, School of Education Sciences,
Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra

Manuscript ID: IJAAR-130628

ISSN: 2347-7075

Impact Factor – 8.141

Volume - 13

Issue - 6

July – August 2026

Pp. 206 - 208

Submitted: 11 August 2026

Revised: 20 August 2026

Accepted: 25 August 2026

Published: 31 August 2026

Corresponding Author:
Dr. Dhananjay Shamsunder Sirsat

Quick Response Code:



Website: <https://ijaar.co.in/>



DOI: 10.5281/zenodo.23472631

DOI Link:

<https://doi.org/10.5281/zenodo.23472631>



Creative Commons



Abstract:

Climate change is creating new challenges for outdoor physical activity and competitive sports. Rising temperatures, heatwaves, changing rainfall patterns, and extreme weather events can affect athletes, sports facilities, training schedules, and competition planning. These challenges are particularly relevant to regions where sports activities are conducted outdoors and access to climate-controlled facilities is limited. This article examines the potential effects of climate-related conditions on sports participation, athlete safety, and physical education. It also discusses practical approaches to heat-risk management, environmental sustainability, and climate-resilient sports infrastructure. The article highlights the need for sports organisations, educational institutions, and policymakers to integrate environmental considerations into sports planning. Climate-responsive sports education can help protect participants while supporting the long-term development of physical activity.

Keywords: *Climate Change, Outdoor Sports, Heat Stress, Athlete Safety, Physical Education, Environmental Sustainability, Sports Management.*

Creative Commons (CC BY-NC-SA 4.0)

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (CC BY-NC-SA 4.0), which permits others to remix, adapt, and build upon the work non-commercially, provided that appropriate credit is given and that any new creations are licensed under identical terms.

How to cite this article:

Dr. Dhananjay Shamsunder Sirsat. (2026). Climate Change and Outdoor Sports: Emerging Challenges for Athletes and Physical Education. International Journal of Advance and Applied Research, 13(6), 206 – 208. <https://doi.org/10.5281/zenodo.23472631>

Introduction:

Outdoor sports depend on environmental conditions. Activities such as athletics, football, cricket, hockey, and recreational running are influenced by temperature, humidity, rainfall, air quality, and the availability of suitable playing

surfaces. Climate change is increasing the importance of understanding how environmental conditions affect physical activity and sporting events. Extreme heat can increase physiological strain during exercise, while heavy rainfall and other severe weather events may disrupt training and



damage facilities. These challenges are relevant to physical education because schools, colleges, universities, and local sports organisations often conduct activities in outdoor settings. Sports administrators and physical education professionals must therefore consider environmental conditions when planning training sessions, competitions, and recreational programmes.

- **Rising Temperatures:**

High environmental temperatures can increase the physiological demands of exercise. When the body cannot dissipate heat effectively, athletes may develop heat-related illness. The risk depends on several factors, including humidity, exercise intensity, clothing, hydration, acclimatisation, and individual health. Sports organisations should therefore establish appropriate heat-risk assessment and activity-modification procedures.

- **Changing Rainfall Patterns:**

Heavy rainfall can make playing surfaces slippery or unsuitable for use. Flooding may damage sports grounds and disrupt training schedules. Educational institutions should develop alternative plans for physical education sessions during unsafe weather conditions.

- **Air Quality:**

Air pollution and smoke from wildfires can affect the safety and comfort of outdoor exercise. Where air quality is poor, institutions should assess local conditions and follow appropriate health guidance.

- **Extreme Weather Events:**

Severe storms, lightning, flooding, and other hazardous weather events can threaten participants and damage sports infrastructure. Clear emergency procedures are essential for schools, universities, sports academies, and event organisers.

Implications for Athletes and Physical Education:

Environmental conditions can influence the scheduling, intensity, and duration of physical activity. Athletes may need modified training schedules during periods of extreme heat. Physical education teachers should consider the age, fitness, experience, and health needs of participants when planning outdoor sessions. Students should also be educated about recognising warning signs of heat-related illness, understanding hydration needs, and responding appropriately to environmental hazards. The aim should not be to discourage outdoor activity but to make participation safer through informed planning and appropriate precautions.

Strategies for Athlete Safety:

1. Heat-Risk Assessment:

Training sessions should be planned according to environmental conditions and the demands of the activity. Institutions should follow recognised heat-safety guidance and modify or suspend activities when conditions become unsafe.

2. Hydration and Recovery:

Athletes should have access to drinking water and suitable opportunities for rest. Hydration plans should reflect exercise demands and environmental conditions.

3. Acclimatisation:

Athletes who are not accustomed to exercising in hot conditions may require a gradual adjustment period. Training intensity and duration should be increased carefully under appropriate supervision.

4. Emergency Preparedness:

Sports facilities should have procedures for responding to heat illness, lightning, severe weather, and other emergencies. Staff should know when to stop activity and seek medical assistance.



5. Flexible Training Schedules:

Where practical, outdoor activities can be scheduled during cooler periods of the day. Indoor alternatives may be used when outdoor conditions are unsafe.

Environmental Sustainability in Sports:

Sports organisations can also contribute to environmental sustainability.

Institutions can promote water conservation, responsible waste management, energy-efficient facilities, and environmentally conscious event planning.

Sports equipment should be managed efficiently, and disposable materials should be reduced where practical. Tree planting and the development of shaded areas may improve the comfort of some sports facilities, although such measures must be planned with appropriate consideration of local conditions.

Sustainable planning should also consider access and affordability. Climate-resilient facilities should benefit community participants and students, not only elite athletes.

Implications for Indian Educational Institutions:

In India, outdoor sports are an important part of school and university life. Hot weather, seasonal rainfall, and differences in local infrastructure make environmental planning particularly relevant.

Educational institutions can develop written guidelines for conducting outdoor physical education during extreme weather. These guidelines should specify procedures for monitoring conditions, modifying activities, providing hydration, and responding to emergencies.

Universities can also introduce climate awareness into physical education and sports management courses.

Further research is needed to examine local heat exposure, sports participation patterns, facility vulnerability, and the effectiveness of heat-safety measures across different Indian regions.

Conclusion:

Climate change presents important challenges for outdoor sports and physical education. Rising temperatures, changing rainfall patterns, air-quality problems, and extreme weather events can affect athlete safety and the continuity of sports programmes.

Educational institutions and sports organisations should respond through environmental risk assessment, appropriate training modifications, emergency preparedness, and sustainable infrastructure planning.

Climate awareness should become an integral part of sports education. By combining physical activity with environmental responsibility, institutions can support safer and more sustainable participation in sports.

The future of sports depends not only on athletic excellence but also on our ability to protect the people, facilities, and environments that make sports possible.

References:

1. Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. Geneva: IPCC.
2. World Health Organization. (2024). Climate Change and Health. Geneva: WHO.
3. International Olympic Committee. (2023). Climate Action and Sustainability Resources. Lausanne: IOC.
4. World Athletics. Health and Science Resources on Heat and Competition Safety. Consult the official World Athletics resources for current guidance.