

The ecological perspective of sport and sustainable development

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LEARNING OBJECTIVES

Upon completion of this chapter, learners should be able to successfully:

1. Define the terms adaptations, adaptive capacity, appreciative theory, climate, climate change, and partnerships
2. Describe examples of partnerships developed by those within sport to advance climate action
3. Consider the advantages of sport generating partnerships for climate action and climate action of sport partnerships
4. Investigate the need for further climate action by those in sport and society
5. Contemplate sport in your local area and the types of partnerships that can be generated to aid climate action

Overview

This chapter examines a critical issue in our contemporary times – our climate – and the need for climate action. Sport is uniquely positioned to be part of the solution. This solution includes advancing the sustainable development of sport (SDoS) and using sport as a platform to advance sport for sustainable development (S4SD) of our world societies. The discussion opens with an overview of our climate issues and then turns to discuss sport's partnerships in the process of mitigating and managing these issues. Sport has utilized diverse partnerships to promote an awareness of – and action on – safeguarding our climate, and multiple examples are outlined. Overall, the chapter supports understandings of current actions and promotes further partnerships for efficient and effective progress for our contemporary climate-related issues.

Glossary

Adaptations

“The process of adjustment to actual or expected climate and its effects, to moderate harm or exploit beneficial opportunities” (Intergovernmental Panel on Climate Change, 2012, p. 556). The modifications are made due to the vulnerability and risks of climate and climate change.

Adaptive capacity

“The combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities” (Intergovernmental Panel on Climate Change, 2012, p. 556).

Appreciative theory

It promotes “a paradigm of thought and understanding that holds organizations to be affirmative systems created by humankind, as solutions to problems” (Watkins & Cooperrider, 2000, p. 6). An application of appreciative theory implies that actions within sport can act as part of climate action.

Behavioral-based theory

This theory indicates that concerns encompass “goals, expectations, and choice” (Bowen, 2007, p. 98). An application of this theory means that those within sport have an option to engage in climate action.

Carbon neutrality

“A means of production where the total output of carbon dioxide during production is neutral, i.e., equal to zero. Carbon neutrality does not imply that businesses will have zero carbon emissions, but that these emissions are offset, i.e., counterbalanced” (Becker et al., 2020, p. 274).

Circular economy

Its main three principles are: (1) Design out waste and pollution; (2) keep products and materials in use; and (3) regenerate natural systems. Applying these principles to businesses and economic systems means, operationally, developing a systemic approach to economic development designed to benefit businesses, society, and the environment (Ellen MacArthur Foundation, 2019).

The focus is to have a regenerative system “through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling” (Geissdoefer et al., 2017, p. 761).

Climate

Following the expertise of the Intergovernmental Panel on Climate Change, the climate is

the average weather, or more rigorously, ... the mean and variability of relevant quantities over a time period ... [with] the classical period for averaging these variables are 30 years, [and] the relevant quantities are most often surface variables such as temperature, precipitation, and wind. (Solomon et al., 2007, p. 942)

Climate change

The “consequences of human activities on world climate” (Rahman, 2013, p. 2); whereby there is “a long-term change in the statistical distribution of weather patterns (e.g., temperature, precipitation, etc.) over ... time” (Rahman, 2013, p. 3). The change means that “the nonlinearity of the climate system may lead to abrupt climate change” (Intergovernmental Panel on Climate Change, 2012, p. 556).

Partnerships

In this chapter, partnerships are voluntary collaborations to deliver messages or services for climate action. Partnerships involve blocks of people/organizations that advance all parties’ legitimacy and allow each party to “win” by offering complementary resources (Zeimers et al., 2019). The partnerships can be same-sector or cross-sector collaborations that offer synergies by co-operating for strategy or program development and delivery (Bailey, 2004) and increasing the chances of success compared to working independently (Wildridge et al., 2008).

Sport

“Sport means all forms of physical activity which, through casual or organized participation, aim at expressing or improving physical fitness and well-being, forming social relationships or obtaining results in competition at all levels” (Szathmári & Kocsis, 2020, p. 4).

Sport and sustainable development (S&SD)

Sport and sustainable development (S&SD) is the process that includes two stages: SDoS and S4SD that, together, enhance the development that meets the needs of current generations without compromising future generations’ ability to meet their own needs at the personal, social, economic, ecological, technological, and political levels (Millington et al., 2021; Szathmari & Kocsis, 2020; Triantafyllidis & Darwin, 2021).

Sport for sustainable development (S4SD)

S4SD refers to the contribution of sport to our global societies’ viability by

encouraging sustainability across the six perspectives of personal, social, economic, ecological, technological, and political worldwide (Macovei et al., 2014; Millington et al., 2021; Schulenkorf, 2012).

Sustainability

The term refers to “the integration of environmental health, social equity, and economic vitality to create thriving, healthy, diverse and resilient communities for this generation and generations to come” (University of California Los Angeles 2021, para. 2).

The term sustainable development encompasses the initiatives and progress in pursuit of sustainability. According to Brundtland Commission (2001), sustainable development is defined as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”(p, 82). This includes “the narrow notion of physical sustainability [that] implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation” (p. 82).

Sustainable development of sport (SDoS)

SDoS refers to the sustainable practices taken by sport regarding the management of sport products, services, and sport consumer behaviors to achieve sustainability within the world of sport that encompasses six perspectives including the personal, social, economic, ecological, technological, and political (McCullough et al., 2020; Szathmari & Kocsis, 2020; Triantafyllidis & Darvin, 2021).

Introducing the ecological perspective of sport for sustainable development (S4SD)

Our discussion now outlines the global climate issue and then summarizes why climatic impacts are an issue for sport. Next, the focus turns to how sport has been working toward being part of the solution by mitigating and managing the climatic problems through partnerships. These partnerships are aiding sport to transition toward sustainability (SDoS) and assist society to also edge toward this transition (S4SD).

The climate issue: Beyond sport

Climate change can arise from the “consequences of human activities on the world” (Rahman, 2013, p. 2). It has been noted as “the greatest threat facing humankind” (Mpandeli et al., 2019, p. 1). This global issue has been exacerbated by human activities, such as the use of fossil fuels, which “are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels” (Trenberth, 2018). A warming trend affects air and water temperatures.

This warmer world causes multi-directional, detrimental climatic impacts (Trenberth, 2018). Examples include “land degradation ... increases in rainfall intensity, flooding, drought frequency, and severity, heat stress, dry spells, wind, sea-level rise and wave action, and permafrost thaw ... [that] has led to shifts of climate zones in many world regions” (Intergovernmental Panel on Climate Change, 2020, p. 10). The temperature increases can generate stress on our communities with risks that encompass “health, livelihoods, food security, water supply, human security, and economic growth” (Intergovernmental Panel on Climate Change, 2018, p. 11). Global warming’s associated challenges are a contemporary real-life issue, and scientists worldwide predict the impacts will continue to advance throughout the upcoming decades (Herold et al., 2018).

It is essential to keep in mind that climatic impacts are *not* applied proportionally worldwide (Tol, 2018). Instead, the effects can be zone-specific and location-specific – making it a complex issue. This is because local and regional conditions, such as elevation levels, forests, and water bodies, can affect climate.

This is illustrated as some world areas are getting drier, and more prolonged droughts occur (National Oceanic and Atmospheric Administration, 2019). Additionally, major forest fires are breaking out in places such as southeastern Australia (BBC News, 2020), parts of Greece (Reuters, 2020), and the west coast of the United States (Selva et al., 2020). Whereas other areas of the globe are concerned about rising sea levels, such as in the Gulf of Mexico (Lindsey, 2020) and in specific cities such as Osaka, Japan; Alexandria, Egypt; Rio de Janeiro, Brazil; and Shanghai, China (Holder et al., 2017). Consequently, all countries and their related industries are not affected in the same way by climate – local and regional variations in the climate impacts mean that responses need to be localized.

We will now examine the impacts of climate on sport and then delve into how sport organizations have responded.

Why climatic impacts are an issue for sport

The relationship between the natural environment and sport has been noted to be “bidirectional” (McCullough et al., 2020, p. 509). Safeguarding the natural environment for current and future generations of sporting participants, therefore, is essential. Yet, fossil fuels are used for travel to sport practices and competitions (Watanabe et al., 2019) and to heat sport facilities and, thus, contribute to global warming (Kellison & Orr, 2020). Additionally, plastic debris can be strewn across our land and blown by the wind into waterways (Jambeck et al., 2018) – including plastic waste from sport facility concessions (Watkin et al., 2021). There are associated environmental consequences based on this type of plastic waste management (Picazo, 2019), as plastics absorb heat from the sun resulting in the release of greenhouse gases (Picazo, 2019). Sport has, therefore, contributed to climate issues and is not immune to the impacts.

There are multiple climatic impacts on sport. Examples encompass the lack of snow for training and the hosting of competitions (Falk & Hagsten, 2017; Scott et al., 2018; Steiger et al., 2017); drought conditions that require sports fields to be given additional irrigation to remain viable; or extreme rain events that cause flooding and require excellent drainage systems to maintain their area playing use (Dingle & Mallen, 2020; Mallen & Dingle, 2017); as well as sport event cancellations due to forest fires (Taylor, 2019). The challenges have been particularly noted for outdoor sport events (Brocherie et al., 2015), where athletes have been exposed to thermal (heat) stress (Brocherie et al., 2015) and are impacted by fossil fuel induced air pollution (Donnelly et al., 2016; Lippi et al., 2008; Malchrowicz-Moško et al., 2019). Notably, a recent study of sport venues indicates that climate change causes “organizational uncertainty, greater management complexity, cost risks associated with water and energy resources, and waste outputs” (Dingle & Stewart, 2018, p. 293). The various examples illustrate that climatic impacts have been felt at sport facilities, summer and winter sport events, and athletes.

Sport and climate action

Due to the impacts, many in sport have been working toward being part of the solution by mitigating and managing the climatic issues. To aid in developing a response, sport partnerships have endeavored to embed climate action. Each of these partnerships aids sport to be one step closer to reaching their adaptive capacity for climatic issues. Such partnerships are key elements that support climate action, and they will now be defined and examples are provided.

Partnerships and the ecological perspective of sport and sustainable development (S&SD)

Partnerships in this chapter refer to voluntary collaborations used to deliver messages or services for climate action. These same-sector or cross-sector collaborations advance all parties' legitimacy and allow each party to 'win' by offering complementary resources (Zeimers et al., 2019). The partnerships generate synergies by cooperating in strategy or program development and delivery (Bailey, 2004), establishing distributed problem solving (the power of the collective group), and increasing the chances of success compared to working independently (Wildridge et al., 2008).

Partnerships are needed as the climate issue is diverse and complex. Understanding the impacts of climate and climate change in each region and acting as part of the solution can be intricate – especially if it is not one's area of expertise. Partnerships offer linkages between the power of sport as a platform – with a particularly strong ability to communicate messages that can be used for promotion promoting climate action – and collectives that can pool their knowledge or with bodies that specialize in climate action.

This chapter purports that each partnership is founded within the tenets of the behavioral-based theory. This theory indicates that concerns encompass “goals, expectations, and choice” (Bowen, 2007, p. 98). Applying this theory means that those within sport choose to engage – or not engage – in climate action. A key challenge for sport organizations and events, however, is that when facing multiple priorities, they tend to concentrate on “day-to-day” objectives such as efficiency and effectiveness [of the current task], at the expense of the long-term gain (Ghobadian et al., 2001). Many in sport have utilized partnerships to make climate action happen despite the day-to-day pressures of managing sport.

Sport partnerships for climate action: Sport for sustainable development (S4SD)

Sport partnerships for climate action are diverse and continue to grow and develop. They each seek to utilize sport as a platform in an effort to safeguard the natural environment. Multiple examples will now be offered.

Athletes have formed a series of collective partnerships as they generate environmentally focused organizations and campaigns. Examples include “Players for the Planet” (<http://playersfortheplanet.org>) which is an organization founded by former Major League Baseball player Chris Dickerson that has connected over 75 professional athletes with a mission to “seek to unite to make sustainability and environmental responsibility foundational values of our sport” (Players for the Planet, n.d., para. 1). The focus is for the athletes to partake in – and to promote others to participate in – the “Save the Ocean Campaign” to clean beaches, re-cycle in their communities, along with reducing their use of plastics. Also, Nico Rosberg (www.nicorosberg.com), a retired world champion Formula One driver, launched the “GreenTech Festival” (<https://greentechfestival.com>) to promote green technologies and encourage

living sustainably. Ellen McArthur, a world record holder in sailing (from Great Britain), set up her foundation (www.ellenmcarthurfoundation.org) that promotes the regeneration of products to generate a circular economy. This type of economy represents natural systems whereby products and material waste are mitigated. There are options to reuse the items at the end of the bottom of the product cycle. New Zealand pole vault Olympian, Eliza McCartney, partnered as a brand ambassador with *Trees That Count* (<https://www.treesthatcount.co.nz>) to encourage tree planting throughout the country to counteract air quality issues. In particular, McCartney has promoted native New Zealand Tōtaro trees that continue to grow for hundreds of years. Brett Sutter, a former professional baseball player, set up a #StrikeOutWaste campaign (Outrider Post, 2020).

Other examples involve organizations made up of those in sport that act to safeguard our natural resources. An example includes the “Sport Ecology Group” (<http://www.sportecology.org>). This group is a partnership of academics building a sport and ecological-based research database for other academics, students, and practitioners. The focus is on sharing the growing body of research and eliminating the academic–practitioner divide. Another example is “Sport4Climate” (<https://connect4climate.org>) with over 500 worldwide partners and seeks to bring athletes, sport organizations, fans, the media, and corporations together for climate action. The multiple international promotional events disseminate the message that “It takes everyone to make a difference” (Sport4Climate, n.d., para. 1). “Green Sport Alliance” (<https://greensportsalliance.org/>) pulls together stakeholders in sport, such as athletes and their fans. The focus within this organization is on program initiatives concerning our global communities’ health and sustainability. And a final example includes “Sport and Sustainability International” (www.sportsustainability.org) whereby sports teams, leagues, and governing bodies work toward advancing sustainable supply chains. This organization promotes awareness of environmental issues and seeks to change attitudes to transition to climate action with a motto of “do more.”

Climate action and sport partnerships: The sustainable development of sport (SDoS)

A number of international and national sport organizations have partnered to safeguard the natural environment by working to be carbon neutral. This means an effort to eliminate or offset their carbon impacts – generally from fossil fuel use and the greenhouse gas release. One begins by developing knowledge regarding their carbon impacts (or carbon footprint) and then continuously reducing carbon-emitting activities to bring down the level in one’s carbon footprint. The International Olympic Committee partnered with the corporation Dow on a program that pushes over 200 National Olympic Committee’s and 77 international sport federations to measure their carbon footprints and then develop and enact plans to mitigate their footprint (Broder-Nemeth & Parshley, 2020). Once an organization’s carbon footprint is measured (using a carbon calculator that can

be found online), there are multiple ways to reduce the footprint, such as diminishing deforestation in your community, advancing efficient energy use, and moving to renewable energy.

Sport facilities worldwide have used renewable solar energy – and there is a growing trend to use renewables to meet 100% of a sport facility’s energy demand. For instance, in Sydney, Australia, Bankwest Stadium has a small solar installation and then partners with a local renewable source to purchase the rest of their energy requirements (Bankwest Stadium, 2019). Golden 1 Center in Sacramento, California, United States, utilizes 100% renewable energy for all of their sport facility operations with a rooftop array of solar photovoltaic (PV) panels and a partnership with a local solar farm (Golden 1 Center Credit Union - Newsletter, 2018). In Dublin, Ireland, Aviva Stadium purchases 100% of its power requirements from clean energy sources (Burke-Kennedy, 2016). New Lawn stadium in the United Kingdom has solar panels to develop clean energy and partners with Ecotricity to offer 100% clean energy (<https://www.fgr.co.uk/another-way>).

Interestingly, and recently, Climate Pledge Arena (<https://climatepledgearena.com/>) moved beyond just using renewable energy to reduce its carbon footprint – as it sought to make its total rebuilt facility carbon neutral. To do this, it partnered with the International Living Future Institute (ILFI) (<https://living-future.org>), an organization that acts as a third party to certify buildings that are energy efficient. This organization sets a high standard for certification and requires:

One hundred percent of the operational energy use associated with the project must be offset by new – off-site renewable energy. One hundred percent of the embodied carbon emissions impacts associated with the construction and materials of the project must be disclosed and offset. (International Living Future Institute, n.d., para. 2)

Guided by the ILFI certification guidelines, the Seattle Hockey Partners collaborated with the naming rights partner, Amazon, to make Climate Pledge Arena the first sport facility in the world to acquire the “Living Future Institute Zero Carbon Certification.” During the rebuilding of the Climate Pledge Arena, home of the National Hockey League Seattle Kraken, all items (such as mechanical or cooking systems) that use fossil fuel have been replaced with fossil-free options (Climate Pledge Arena, n.d.).

Instead, the arena was outfitted with electrical outlets that were fed by 100% renewable energy, including solar panels on the roof and access to off-site renewable power generation (Climate Pledge Arena, n.d.). It has been noted that Amazon pushed to reconsider the rebuilding to ensure it was carbon neutral (Newcomb, 2020) and that the arena was not named after Amazon. Instead, the name of the arena promotes a pledge. This pledge stems from the American Business Act whereby 154 companies have signed on and pledged “to

demonstrate their support for action on climate change and for the climate change agreement in Paris that takes a strong step forward toward a low-carbon sustainable future” (The White House Archives, n.d., para. 1). This multiple-party partnership represents a movement to ensure that the latest sports facilities are positioned for climate action.

Furthermore, some sport facilities have partnered with their local communities to feed renewable energy back into the grid to meet community power needs once their own facility needs have been met. For instance, Amsterdam Arena has a solar energy generating system and a battery storage system that provides power to the local community energy grid whenever needed to alleviate the pressure during extreme demand (Wentworth, 2018). This sport facility battery storage system utilizes second-hand/second-life Nissan “Leaf” batteries to advance their energy storage capacity (Pratt, n.d.; Wentworth, 2018).

Sport has also partnered to source power generation at sport facilities. For instance, in Philadelphia, United States, Wells Fargo Center is 100% reliant upon renewable energy. This facility has purchased wind power generated through a partnership with a community grid provider (Pratt, n.d.). Additionally, Tokyo Olympic Stadium in Tokyo, Japan, was built so that “every venue used at the Games will be powered by 100% renewable energy” (Golob, 2020, para. 6) with a combination of solar, biomass, and hydropower (Olympic News, 2019) along with a “geothermal heating/cooling system” (Tokyo 2020, 2019, para. 3). Further, a partnership with Toyota offers fuel cell electric cars (Tokyo 2020, 2019). Another example is Ashton Gate Stadium in Bristol, England, refurbished with 460 PV panels and a biofuel boiler (Bristol City Council Newsroom, 2016). Biofuel can be generated from various raw organic waste, such as plant-based molecules (dead leaves, corn), sugar, and starches (Nunez, 2014).

Furthermore, the National Collegiate Athletic Association in the United States has relied upon the National Weather Service’s “Air Quality Forecast System” (www.ncaa.org/sport-science-institute/air-quality) for air quality reports. Also, sport has been utilizing ever-advancing technology to make it easier to measure indoor facility air quality, and government bodies have established indoor sport facility air quality recommendations. For instance, 12.5 ppm of CO is the maximum level recommended for ice skating arenas in the Province of New Brunswick in Canada (Government of New Brunswick, n.d.). This level is supported in the Province of Manitoba, Canada, where a further indoor recommendation for NO₂ is at a maximum of 0.25 ppm (Government of Manitoba, 2009). Government scientists are aiding sport to establish acceptable air quality levels for sport facilities.

And a final example involves waste management awareness programs. It is common to attend a sport event and to see messages concerning waste management recycling. Further, these messages can be guided by actions laid out by groups such as “Waste Management Sustainability Services” (<https://www.wm.com>) and their specific sustainable sports program.

Sport is impacted by a period of significant transition

The examples outlined above illustrate that a movement is underway in sport to engage in climate action. Sport and climate action include an awareness of contemporary climate issues and a partnering strategy to aid the movement's effectiveness toward safeguarding the natural environment. There is, however, an additional consideration due to our contemporary period of significant transition caused by the pandemic from Covid-19. Scott McRoberts will now discuss this issue as it relates to sport.

Experts view by Scott McRoberts, Director Athletics, University of Guelph and Associate Director, International Institute for Sport Business and Leadership and M.A. Student Andrew Masters

Due to the global impact of Covid-19, it is important to discuss the impact of such an occurrence on sport and environmental sustainability. The full extent of sport's recovery and adaptability as a result of the Covid-19 pandemic is still unknown; however, there continue to be opportunities and creative thinking that have laid the foundation for a transition to a more sustainable sport world. Certain sport events were forced to think of a new way of operating, simply for survival, but some were able to do so with an even greater sustainable method of operations. Predictions that arise from the impacts of the pandemic on sport and sustainability include, for example, that in early December 2020, the world took note of events such as the Challenge Daytona (<https://challenge-daytona.com/>), a triathlon event that took place in the empty Daytona International Speedway (home of the Daytona 500). Dr. Norm O'Reilly, Professor and Director, International Institute for Sport Business and Leadership at the University of Guelph, said:

It took place in a venue that had many uses in the pandemic, from swimming events to orienteering championships. There were no fumes. There was no litter and no waste. The triathlon world loved it. From a sustainability standpoint, it was certainly an interesting view on what a world-class event could be.

The standard for a clean competition environment has been set for future events and looks to see how athletes fight for such conditions into the future. Also, consider that the lack of stadiums packed with spectators in future events may help advance sustainability. "With COVID's creation of a reluctance to travel, you could see less sport tourism in the years to come than in pre-pandemic times," says Tim Strobel, Professor Marketing and Sport Management at the University of Bayreuth in Germany. The management of this issue is already underway as "It will be easier to seamlessly integrate digital aspects into events ... [as] People have become used to digital atmospheres at games," says Strobel. This trend will continue with further digital technological advances. Additionally, while the term "carbon neutral" may be a trending concern in many areas of the environment, it is one that some areas of sport may struggle to

reach for some time. The reason is old facilities, says Steve Nyman, Director of Maintenance and Energy Services at the University of Guelph. He notes that, for example, to change some older athletic facilities' heat source to a grid, the electric power source may increase heating costs several times over. While new facilities may effectively implement these systems into their design, the outlay to alter old facilities may not be available in times of economic concern, when it can be tough to justify investing in green initiatives when staff is being furloughed. This means that actions toward economic sustainability in post-pandemic times will slow actions for environmental sustainability.

Notably, sport has the power to encourage a critical body of people around the globe to be aware of, and to act, to advance environmental sustainability. Sport for environmental sustainability is noted at the University of Guelph, like many other institutions, lists sustainability as a central focus in its operations. While specific "behind the scenes" changes can be made to a sport facility, such as adopting a more energy-efficient boiler, another factor involves optics. Nyman says. "The most important thing we do on campus, in terms of environmental sustainability, is not gathering up compost or any of those smaller measures. It's promoting the thinking behind our initiatives". Nyman noted that if 4500 students graduated per year, the power is actually in those graduates. Suppose the electric Zamboni at our arena (the ice cleaning machine) contributes a small tonnage of the carbon dioxide emissions, but the 2500 fans at a hockey game watching the Zamboni go around the ice is what is also important is that it should be a moving billboard saying, "We are sustainable at the University of Guelph." This means the Zamboni contributes a measurable reduction in air pollution towards sport sustainability, but the advertising effects become longer term impacts. As the students become aware of an environmental way of thinking sponsored by their alma mater and pass the mindset along to future generations, the effects of simple, low-cost efforts become much wider than their intended audience and have the potential for reimagining sport and the world and create a much greener world than the science in the machine can on its own.

Considering these points, write a statement that informs athletes of the environmental conditions they are to compete in (i.e., level of clean air, water). Outline how athletes can work to achieve these conditions for every sport competition. Next, discuss the impact on sport and our natural environment and financial sustainability of reduced sport travel and digital technology advances for broadcasting sport events worldwide. What advances can be expected in post-pandemic times if sport venues struggle financially while becoming carbon neutral? Consider the environmental awareness campaign proposed in the exposure of the Zamboni machine above. Design awareness campaigns for your sport/venues. What message would you promote?

Concluding remarks

1. To date, we have not resolved the climatic issues that impact sport and society
2. Much work remains to be done to reach our adaptive capacity
3. The authors of this chapter promote the groundwork (as illustrated in the examples above) to further climate action within all sports aspects
4. Partnerships are critical to effective solutions, and sport needs to continuously seek out the partners necessary to aid in effective and successful climate action
5. Sport is positioned well to show the world how to advance climate action and successfully safeguard the natural environment for sport and society
6. Let all of us contribute and do our part to achieve environmental sustainability!

Future directions

1. Sport is not exempt from the climate change issue – so let's be proactive. Be part of the solution. Consider how you can contribute to solving the real-world climate issues
2. Sport needs to find strategies to advance knowledge on location-specific climate impacts continuously
3. Sport must adapt to the vulnerabilities of climatic impacts by advancing the strategic options for mitigating and managing such impacts – and develop partnerships to aid in reaching adaptive sports capacity for climate action
4. Sport can continue to show the world how to successfully implement comprehensive climate action that becomes synonymous with sport to safeguard the natural environment for those in sport today, and into the future, along with our global societies

Review questions

1. In your own words, define adaptations, adaptive capacity, appreciative theory, climate, climate change, and partnerships
2. How does the appreciative theory apply to sport climate action?
3. What is your understanding of how our contemporary climate change situation impacts sport?
4. What is your understanding of how sport impacts our natural environment?
5. How have partnerships aided sport in responding to climate impacts? Outline the advantages of these partnerships for sport
6. The chapter discussed sport's response to climate change, what has sport done to respond? Is it an adequate response?

Discussion questions

1. Should sport be used as a vehicle for climate action? Why or why not?
2. Is there an awareness of the climate issue impacting sport in your region? If not, how can this be advanced? If so, what is noted, and is it enough?
3. Is there an awareness of the climate issue impacting your local community? If so, how is it affecting the community?

4. What are athletes doing to safeguard the natural environment in your region? How can you get involved?
5. What are sport teams doing to safeguard the natural environment in your region? How can you get involved?

Learning activities

1. Envision and record your idea of what the ecological perspective of S&SD can contribute to the global efforts for sustainability
2. Generate a long-term goal and at least four objectives for your vision – ensure at least one objective applies to SDoS and one for S4SD for the ecological perspective of S&SD
3. Write strategies and tactics for achieving each objective for the ecological S&SD

Consider sport partnerships that can assist you in achieving your stated objectives. List five potential partnerships and outline the value these partnerships can provide for achieving climate action.

Further reading

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6. Marlier, M., Constandt, B., Schyvinch, C., De Bock, T., Winand, M., & Willem, A. (2020). Bridge over troubled water: Linking capacities of sport and non-sport organizations. *Social Inclusion*, 8(3), 139–151.

Online relevant resources

1. Green Sport Alliance (GAS): (<https://greensportsalliance.org>)
2. Sport Ecology Group (SEG): (<https://www.sportecology.org>)
3. Players for the Planet: (<http://playersfortheplanet.org>)
4. Sport Sustainability: (www.sportsustainability.org)
5. International Living Future Institute: (<http://living-future.org>)
6. Connect for Climate: (<https://connect4climate.org>)
7. PlayGreen Project: (<https://www.playgreenproject.eu>)
8. Sport for Climate Action: (https://unfccc.int/sites/default/files/resource/Sports_for_Climate_Action_Declaration_and_Framework.pdf)
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