

IOC Guide on Sport, Environment and Sustainable Development

4.1 Sports and environmental conditions

The IOC divides the sports disciplines between the Summer and Winter Olympic Games. From a purely environmental point of view, we shall distinguish instead between indoor and outdoor sports. Some sports are actually in both categories.

Indoor sports are held essentially in a constructed, wholly artificial environment, which is non climate-dependent and created by people. The need is for:

- the environmental conditions thus created to favour the practice of the sport;
- the building to blend in with its setting;
- the building to be adapted to long-term real needs;
- the building to be resource-efficient (water and energy) operationally;
- the different emissions and waste generated by operating the building to avoid any harmful impact on the environment;
- the facilities offered by the building to be used to maximise the social and economic development of the population of the area where it is sited.

For their part, outdoor sports are much more dependent on the natural environmental conditions (physical state of the water, slope of the ground, size of waves, wind speed, etc.). A distinction must be made between sports practised in a natural environment, on land or water, with few or no facilities, and stadium sports, where the environmental conditions are closer to those for indoor sports.

Traditionally, a distinction is made between summer and winter sports. Only the physical state (liquid or solid) of the water differentiates, in environmental terms, the conditions in which summer and winter sports are held. Winter sports require solid water, in the form of ice or snow.

4.2 Summer land-based sports in the natural environment

The land-based Olympic sports practised in a natural environment addressed in this chapter are cycling and riding. Apart from the events held on a track or race course, both can have a direct effect on natural ecosystems.

The aim is essentially to limit, or even avoid, damaging the richness of these ecosystems while enabling the athletes and public to derive maximum benefit from them. To this end, those who practise the sports but also the event organisers and spectators need to be informed and made to take personal responsibility.

The functioning of land ecosystems depends on three types of factor:

Abiotic factors (linked to physicochemical aspects), such as:

- Climate factors: light, temperature, rainfall, relative humidity, wind, traces of gas in the air (carbon dioxide, ozone, nitrogen oxides and volatile hydrocarbons) and particles in suspension;
- Soil factors: water content, texture, structure and organic matter.

Biotic factors (linked to flora and fauna)

- Intraspecific factors (particular to each species): species number or biomass, its growth, its sex ratio and age pyramid;
- Interspecific factors (relations between species): diversity of plant and animal populations (biodiversity), nutritional relations, competition and parasitism.

Anthropic factors (related to man and his activities)

- Demographic pressure;
- Level of urbanisation and communication infrastructure density;
- Method of using resources (intensive or extensive agriculture).



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These three types of factors are closely linked. For example, an abiotic factor like humidity depends greatly on the biotic factor of vegetation density, which itself depends on an anthropic factor like the level of urbanisation.

Outdoor sports activities in the natural environment will have an impact on all these factors. The repeated passage of cyclists or riders can cause changes to an abiotic factor such as soil structure. By disturbing wild animals during their reproductive periods, they may also influence a biotic factor such as species numbers. Lastly, an event which attracts spectators will have a strong temporary impact on an anthropic factor such as demographic pressure.

It is also important to distinguish the objective factors in the functioning of an ecosystem, as described above, from its **perceived richness**. The perceived richness of an ecosystem includes aspects which people can recognise immediately, such as physical aspects (landscape and climate); biological aspects (types of plants, trees or animals); economic aspects (the plants grown and animals raised, means of communication); social aspects (activities and lifestyles of populations); aesthetic aspects (harmony between the elements which make up the landscape, light and transparency); and cultural aspects (monuments, historical sites and centres of worship).

A change in the objective factors in the functioning of an ecosystem can have a very long-term impact, while any damage to its perceived richness has an immediate impact.

Practising sport within an ecosystem must preserve the abiotic and biotic factors which ensure its functioning, but also respect all the aspects which constitute its perceived richness.

4.2.1 Cycling

4.2.1.1 General

Cycling is, after walking, the most widespread sport in the world. As a competition sport and a leisure activity, it is particularly popular. The Tour de France is one of the biggest sports events in the world. Cycling is practised in natural environments and in velodromes, both covered and non-covered, and indoors.

Together with cross-country skiing, sailing and rowing, cycling is a wholly non-polluting mechanical sport with no need for non-renewable energy resources, and therefore meets the sustainable development criteria. With walking, cycling is the simplest way to practise sport and is an economical and non-polluting means of transport ideal for daily travel. Learning to ride a bicycle is also a key moment in a child's development.

The bicycle is a means of transport that contributes to solving congestion and pollution problems due to motor traffic, particularly in cities of developed countries. In developing countries economic progress favours a change from bicycles to motorised vehicles (two-wheeled or cars), and their excessive use causes environmental, sanitary and energy problems.

Some facts

- Bicycles transport more people in Asia than all the cars in the world.
- It takes at least 200 years for a plastic bottle (a bicycle water bottle, for example) to decompose in the natural environment.
- On Thursday 24 February 2000, Bogotá (Colombia) became the first city in South America to organise a car-free day, when almost all the 832,000 private cars were not allowed to enter the city between 6.30 a.m. and 7.30 p.m.
 - 85% of the population used public transport
 - A reduction of nearly 75% in traffic-related injuries
 - Nitrogen oxide emissions reduced by 8%
 - Microparticles smaller than 10 microns reduced by 10%



Figure 28: Unfortunately, giving up cycling is seen as a sign of progress in developing countries (Ho Chi Minh, Vietnam).

4.2.1.2 *Cycling that respects the environment and sustainable development*

Cycling is an exceptional way of learning about nature. Whether cycle-touring or off-road mountain biking, if certain rules are respected, it enables you to discover landscapes and people whilst respecting the environment.

Rules of conduct for cycling in the countryside

- Never leave marked tracks to avoid disturbing animals, particularly during their reproductive periods (chiefly in the spring or the start of the rainy season);
- Never cycle over fields with crops. When crossing meadows or woods, ask the landowners' permission beforehand;
- Never leave your rubbish behind (bottles, leftover food, packaging, punctured tyres, broken bicycle parts, etc.);
- Avoid cycling too often over the same paths to avoid compacting the ground, creating erosion channels and destroying the vegetation;
- Be respectful towards the local inhabitants, their way of life and customs. If you are in any doubt about which paths to take, ask for their opinion.



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Figure 29: Cycling in the countryside is a fantastic journey of discovery which should respect the environment.

4.2.1.3 The impact of cycling events

a) Cycling events in the natural environment

The cycling events in the natural environment, generally very popular, are cyclo-cross, mountain bike, BMX, trial and road cycling. They attract a large number of competitors with their coaches, entourage, often a large advertising presence and large numbers of spectators whom it is difficult to control, as they are spread out over long distances by the side of the road or path. Cycling events in the natural environment also involve the presence of many motor vehicles, both accompanying the cyclists and to transport the public.

Responsibility of those involved in cycling events in the natural environment

Organisers' responsibility

- Follow the guidelines of the International Cycling Union (UCI) concerning mountain bike (MTB) competitions (ref. 9). These guidelines are aimed at groups intending to stage events, and focus on six main factors: noise, transport, waste, soil erosion, destruction of flora and disturbance of fauna. These guidelines take into account the fact that, for most MTB events, the main environmental risk is not the visible impact but a long-term indirect one, particularly soil erosion, damage to vegetation in mountain areas, or disruption to animal life during specific periods;
- Consider when possible, the use of products that conform to environmental and sustainable development criteria;
- Inform the public of the rules of conduct regarding safety, respect for the environment and waste management;
- Wherever possible, provide waste collection areas;

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- Make provision for a system to return the competition venue and surrounding area to its original state after the event.

Competitors' responsibility

- Do not litter the natural environment with empty bottles.

Responsibility of teams, coaches, entourages and the media

- Choose cars and motorbikes which pollute as little as possible. Opt for models with anti-pollution systems (catalysers and particle filters), electric engines, hybrid models or those which use bio-fuel;
- Inform the competitors (coaches' responsibility) and the public (organisers' responsibility) of how they should behave in order to protect the environment.

Advertisers' responsibility

- Choose vehicles which pollute as little as possible;
- For the promotional items distributed to the public, minimise packaging and avoid plastic packaging, and state clearly on the object or its packaging what to do to avoid the item and its packaging becoming a source of pollution.

Responsibility of the public

- Whenever possible, travel to the competition on foot, by bicycle or by using public transport;
- Do not pick plants, flowers, branches, stones, rocks, shells, etc.;
- Whilst respecting the safety measures, keep close to the path or road where the competition is taking place and avoid walking on crops in fields or disturbing the livestock;
- Do not throw down any package, rubbish or leftover food;
- Do not throw down matches, cigarette ends or of pieces of glass which are not very degradable and could cause fires;
- Do not light fires except in specially designated hearths, and make sure that any fire is completely extinguished afterwards.

b) Cycling events in stadiums

Cycling events on tracks and in stadiums are sprint and endurance competitions, trial, artistic cycling and cycle ball. For these events, it is necessary essentially to follow the general rules on the environment and sustainable development for events held in stadiums (cf. Chapter 3.4.).

4.2.1.4 Special waste, toxic products and pollutants linked to cycling

A priori, there are no toxic products and pollutants linked to cycling. However, some glues used to repair tyres and inner tubes may contain hydrocarbons (n-hexane), carcinogenic aromatic organic solvents (benzene, toluene, xylene or ethylbenzene) or carcinogenic chlorinated organic solvents which are difficult to biodegrade (mainly trichloroethylene).

These products are volatile, and using them, particularly in poorly ventilated areas, leads to inhalation which can be damaging to health. In addition, as some solvents are difficult to biodegrade, if the glues which contain them are left in the natural environment (tubes of glue or discarded tyres), there is a risk of bioaccumulation within organisms and negative effects on predatory species (birds of prey, carnivorous fish, etc.).

For this reason, only glues with mineral solvents should be used, and therefore brands which clearly state the composition of the glue on the packaging.



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4.2.1.5 Other aspects of cycling linked to sustainable development

- Cycling is a remarkable tool for freedom and equal access to nature, travelling and meeting other communities;
- Cycling is an activity which is accessible to all members of a community, and as such is a tremendous tool for the integration of different social groups (young people, old people, women, ethnic group representatives, people with disabilities, etc.);
- Cycling, particularly cycle-touring and mountain biking is a tool for tourism development in regions outside the main tourist areas.



Figure 30: Cycling is the most accessible and environment-friendly form of transport, and a tool for freedom and discovering nature (Ouagadougou, Burkina Faso).

4.2.2 Equestrianism

4.2.2.1 General

Equestrianism comprises several disciplines: jumping, dressage and eventing, with individual and team events for each of these. Equestrianism is the only Olympic sport practised in teams with an animal, and it is one of the rare sports where men and women compete on equal terms.

Equestrianism is a sport but also a means of transport rooted in the history of most civilisations. The relationship between human being and horse goes far beyond its utilitarian aspect for humanity. In addition to the Olympic equestrian disciplines, there are several other individual or team disciplines which, at world, regional or local level, are based on the human-and-horse partnership, such as polo, horseball or tent pegging on the Indian subcontinent. Special events are organised for certain types of horse, such as ponies.

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Figure 31: Equestrianism is practised by a team formed of a human being and an animal. It has an emotional dimension which lies behind mankind's respect for nature.

The human-horse relationship has an emotional dimension which lies behind mankind's respect for nature which, from Plato to Haeckel, has led to the emergence of the concept of ecology.

Some facts

- A race of horses which nearly died out in the 20th century was the Mongolian or Przewalski horse. These are small horses which lived wild in Mongolia and China but which, during the first half of the 20th century, saw their pastures invaded by domestic breeds. By 1960, Przewalski horses had disappeared from the Gobi Desert. Fortunately, some had been taken to zoos where they reproduced successfully. Through its Global Environment Facility, the United Nations Development Programme (UNDP) put in place a programme in 1990 enabling the species to be reintroduced into its natural environment. Individual horses from zoos were first accustomed to life in semi-freedom in areas of Canada, China, Germany, the Netherlands and Ukraine, then successfully introduced into protected areas in their region of origin.
- Horse manure has been a well-known and highly valued fertiliser since time immemorial. The production of high quality fertiliser by composting horse manure is a method developed in China over thousands of years. Chinese sages noted that composting not only produced better fertiliser but also meant less danger of disease than using fresh manure.
- During the sailing ship era and before knowledge of chemistry allowed for a better understanding of the chemical reactions of composting, there was a highly dangerous sea traffic in compost. Many ships were lost at sea, as the compost carried in the hold continued to ferment and produce methane, which could lead to explosions.

4.2.2.2 An environment-friendly approach to equestrianism

For riders, respect of the environment begins with respect for their horses and the best living conditions for them (stable, food, training rhythm, organisation of their old age, etc.). When people ride horses in the natural environment, attention must also be paid to respecting other users and the areas where they ride.



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Rules of conduct for preserving the environment when practising equestrianism

- Train, ride and care for your horse in a spirit of understanding the animal's needs, well-being and environment;
- Put the interest and well-being of the animal ahead of the technical demands of the various equestrian disciplines;
- Ensure a worthy retirement for horses which can no longer be ridden;
- For the animal's food and bedding, equipment and clothing, consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Whenever possible, use public transport or a bicycle or travel on foot to and from the stable or riding centre;
- Do not leave marked bridlepaths to avoid disturbing wildlife, particularly during their reproduction periods (chiefly the spring or start of the rainy season) if riding away from tracks;
- Never ride on fields with crops growing. Before crossing fields or forests, ask the landowner for permission;
- Never leave any rubbish (bottles, leftover food, etc.) where you have ridden;
- Never light fires in the natural environment, or if you have to do so control them carefully and ensure that the fire is completely out before you leave;
- Avoid riding too often over the same tracks to avoid compacting the soil, erosion caused by runoff and the destruction of flora;
- Be respectful towards the people you encounter, their way of life and their customs. If in doubt about which paths to take, ask their advice.

4.2.2.3 *The impact of equestrian competitions and the necessary facilities*

Equestrian competitions are held in indoor or outdoor arenas, except for the cross country part of eventing which takes place in the countryside. These events have an impact on buildings and facilities, energy saving, waste management and preservation of the natural sites used for the cross country course.

Responsibility of those involved in equestrian events

For the organisers

- Provide the public with a user-friendly public transport system to get to and from the event;
- Preference should be given to day-time competitions if renewable energy is not available for lighting;
- Provide the horses with stables and training areas which best ensure the animals' well-being;
- Provide the competitors and public with an adequate number of well-maintained toilets and rubbish disposal facilities, to enable waste water to be treated and solid waste to be recycled or destroyed with no risk;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection;
- Recover the manure from the stalls and competition area and compost this for use as fertiliser;
- Collect and ensure the appropriate destruction or recycling of damaged equipment and accessories (broken fences, lost horseshoes, etc.).

For the cross country course and other types of competition in the natural environment

- Choose public access roads which best respect the site and the people who live there, and indicate these routes clearly;
- Along the course, provide the public with an adequate number of toilets and rubbish disposal facilities;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection;
- After the event, collect and ensure the appropriate destruction or recycling of the rubbish collected in the bins provided for the public;
- After the event, return the sites used to their previous state. Make provision for an indemnity to cover any damage caused to individuals or groups.

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For the competitors

- Ensure that your respect for your animal is exemplary;
- Set an example in terms of fair play and respect for the environment. Do not drop rubbish on the competition area, along the cross country course or in the stables.

For the public

- Whenever possible, use public transport or a bicycle or travel on foot to and from competitions;
- Respect the rules of conduct with regard to the use of toilet facilities and waste disposal, particularly for packaging and empty bottles.

For the cross country course and other types of competition in the natural environment

- Do not leave the marked paths;
- Do not take anything from the natural environment such as plants, flowers, branches, pebbles, stones or shells;
- Show respect and caution towards the animals.



Figure 32: The organisers, public and riders must be particularly careful to ensure that the eventing cross country competition blends in without damage to the countryside in which it is held.

4.2.2.4 Special waste, toxic products and pollutants linked to equestrianism

There are no special waste, toxic products or pollutants linked to equestrianism. However, horses produce manure which is a valuable commodity for agriculture. Horse manure is an excellent fertiliser, provided that the ratio of carbon to nitrogen is balanced, for agricultural use (enriching soils and growing mushrooms). The manure can be used directly, but in this case, as the ratio of carbon to nitrogen (C/N) is around 20 and therefore low, it does not allow for optimum agronomic yields and can contain bacteria or weed seeds.



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It is preferable to use manure that has been composted, i.e. after a natural biochemical transformation which, through the heat it produces, destroys the bacteria and weeds. For optimum use as fertiliser, the C/N ratio should be 30.

Generally, horse manure has a ratio of 20, so straw (C/N ratio between 60, for straw from oats or rye, to 150, for wheat straw) or sawdust (C/N ratio of 200) to reach 30. To calculate the quantity of straw needed to achieve the ideal ratio of 30, use the following formula:

$$np = 10 \times nf / (Rp - 30)$$

Where: Rp: C/N ratio of the straw
np: quantity (by weight) of straw
nf: quantity (by weight) of manure

Example: For 100 kg of horse manure to be balanced with wheat straw, the formula will look as follows:

$$np = 10 \times 100 / (150 - 30) = 8.3$$

You will therefore need to add 8.3 kg of wheat straw

In practice, to make good quality compost, a pile of three layers of straw, manure and earth are needed, each around 20 centimetres thick. The third layer, to cover the pile, must be of moist, preferably clay-based earth. This helps to maintain the heat inside the pile and prevent the nutrients in the compost from being lost into the air. The pile of compost needs to rest for ten days, which is the time needed for the specific bacteria to break down the organic matter. This reaction produces large amounts of heat, which kills the weed seeds and the other bacteria and microbes inside the compost heap. After this period, it is better to use the horse manure compost as quickly as possible to avoid nutrients being lost.

In addition to its fertilising qualities, horse manure also improves heavy soils thanks to its drying power.

4.2.2.5 Other aspects of equestrianism linked to sustainable development

One aspect of equestrianism linked to sustainable development concerns the preservation of biodiversity. Indeed, equestrianism is a conservation method not only for horses but also for their natural environment. This applies both to the environments needed for horse riding and to the natural ecosystems needed by certain species of wild horses, like the Przewalski.

Equestrianism is also an excellent means of developing, particularly among children, an education which includes respect for animals. Pets, like cats, dogs or guinea pigs, are often reduced to the role of toys in an artificial environment, which prevents children from learning the specific character and importance of the animal world. This is not true of horses, which the rider has to understand and know perfectly to be able to develop the intimate relationship which this sport requires.

In addition, equestrianism practised in the countryside must set an example in terms of the other users of bridlepaths, such as walkers and cyclists, as well as the other animals encountered and the surrounding vegetation.

Lastly, in many areas in developing countries, the horse is still a valuable means of transport, being cheap and producing no pollution, and therefore fully meeting the criteria for sustainable development. For example, in cities, using horse-drawn carts to collect rubbish allows access to areas which are inaccessible to cars. Furthermore, horses (like donkeys and mules) are often the only way to move around in rural or mountainous areas with an inadequate road infrastructure.