



Topic: Soil / Weather / Climate

Dr Rebecca Ellis and Dr Alison Trew,
PSTT College Fellows, link cutting-edge
research with primary science

✉ rebecca.ellis@pstt.org.uk

✉ alison.trew@pstt.org.uk

Why are football pitches flooding?

Do you like to play or watch football? From the top teams to the local park, football is a popular game. It is often voted the UK's favourite sport. Did you know that climate change might be causing problems on the pitches (Figure 1)?

Is there a grass pitch, park or playing field near you?

Does it ever get very wet or flood?



Figure 1. A waterlogged football pitch. © Birmingham County FA

What is happening to football pitches?

Football players are used to playing in the rain and don't mind getting wet. However, too much water on the ground is a big problem. Footballers say that their pitches are flooding more and more often. Sometimes the rain just can't drain away quickly enough. Sometimes nearby rivers are flooding the football grounds. The pitches can take months to recover. This means that tens of thousands of matches are cancelled each year. Players miss out on exercise and skills practice.

Where could flood water come from?

What other sports could be affected by flooding?

Is our winter weather changing?

In the UK, storms occur more often in the autumn and winter. Storms with high wind speeds are dangerous. Trees can fall, powerlines can break, and buildings can be damaged. Heavy rainfall can cause flooding. Weather forecasters try to warn us about these storms by naming them. The first severe storm each autumn is given a name starting with A. The next storm has a name beginning with B and so on. You can find out what this year's names will be on the UK Storm Centre [website](#).

What type of damage is caused by storms?

Do you know the name of a recent storm?

In 2023-2024 the British Isles had twelve storms. The last one was storm Lilian in August 2024. It was the first time that the letter L had been used to name a storm.

You might think that this proves that our winter weather is getting worse. However, scientists know that the number of storms we get changes a lot from year to year. For example, in the previous year, 2022-2023, there were only two named storms.

What did climate scientists already know?

Some human activities are changing Earth's **atmosphere**. We cut down trees and burn **fossil fuels**. As a result, there are more heat-trapping gases like **carbon dioxide** in the atmosphere. These gases act like a blanket around our planet. Earth has warmed by almost 1.2°C in the last 200 years. The ten most recent years are the warmest years on record.

Does it really matter if it is warmer? You might think that a rise of 1 or 2 °C where you live would not be a problem. However, over the whole Earth, it can make a big difference. **Global warming** affects the **water cycle**. It is changing weather patterns across the world. Scientists use **climate models** to help us understand and get ready for these changes.

When might we use fossil fuels?

How do you think warmer temperatures affect the water cycle?

What did the climate scientists find out?

Firstly, the scientists studied the past weather records. They found that 2023-2024 was one of the wettest years ever. Then, they looked at the amount of rain falling on stormy days. They found it had increased in recent years.

Next, the scientists used climate models. They compared the climate of now with that of the past. This showed that the UK's wetter winters are due to global warming. The models predict that rainfall on stormy days will get heavier in the future. This might not happen all the time because our weather is very variable.

Who do you think might need to know about our winters getting wetter?

What does this mean for football?

A quarter of UK football pitches could be flooded by 2050. It is important to remember that we can avoid this by acting now.

Firstly, football clubs can prepare their football pitches to cope with heavy rain. To reduce the likelihood of flooding, they **aerate** grass pitches so that water can drain away quickly (Figure 2).



Figure 2. An aerating machine puts holes in the ground to let water drain away. © Birmingham County FA

What do we mean by aerate?

What types of soils will let water drain away rapidly?

How do you think we can improve water draining in soils?

Football clubs can also try to reduce the amount of energy they use. This lowers their impact on the climate. For example, floodlights with LED bulbs use less electricity. Meanwhile, inside lights could work on sensors. Some football clubs have solar panels which make electricity but not heat-trapping gases (Figure 3). Diesel lawn mowers can be replaced with electric ones. Many clubs are collecting pre-loved football boots to be reused. This saves money and is better for the planet.



Figure 3. Solar panels on the roof on this football club house produce clean energy. © Birmingham County FA

Many sports clubs across the world have joined 'Sports for Climate Action.' They are working to reduce the impact of sports on climate change. You can find out more on their [website](#).

How can you, your family and your school use less?

What is your local football club doing for climate action?

Glossary

aerate – put air into a material

atmosphere – the layer of gases surrounding the Earth or another planet

carbon dioxide – a colourless gas with no smell that is naturally present in air. It is made from carbon and oxygen

climate change – long-term change in the average weather patterns on Earth

climate models – a computer representation (simulation) of the Earth's climate system, including the atmosphere, ocean, land and ice

global warming – the long-term increase in the Earth's overall surface temperature

fossil fuels – such as coal, oil, petrol, diesel and natural gas are formed from the remains of ancient plants and animals and are found in Earth's crust

water cycle – the journey that water takes as it moves from the land to the sky, and back again. As water goes on this journey, it can be a liquid (water), a gas (vapour) or a solid (ice)

The paper that inspired this work was:

Autumn and Winter storms over UK and Ireland are becoming wetter due to climate change.

By S. Kew, M. McCarthy, C. Ryan, J. S.R. Pirret, E. Murtagh, M. Vahlberg, A. Amankona, J. O. Pope, O. Claydon, B. Coonan, I. Pinto, C. Barnes and Sjoukje Philip.

Published in Grantham Institute for Climate Change *collection* (2024). Last accessed 3.12.24

Acknowledgement:



This resource contributes to XAIDA – a project supported by the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003469.

A Teacher Guide (slideshow) describes related investigations for children and ideas for teaching children about climate change. Visit PSTT's [Did you know?](#)