

Teaching about the hidden climate threat of drought in the UK

How often have you heard 'It always rains in the UK'? With our focus on seasons and observable changes in the water cycle through the processes of evaporation and precipitation, primary science teachers are central to unpicking such common misconceptions. It doesn't rain nearly as often or as heavily as people may think, and as we move deeper into the climate and ecological emergency, we need to consider how we adapt our teaching models and resources. We need to engage and enable learners in ways that will provide knowledge, personal expertise and community understanding in water use and lifestyle adaptations for more sustainable use. It is about valuing water as '*precious, fragile and dangerous. It can sustain or destroy*' (UN High Level Panel on Water, 2016).

So, what do we know about drought?

There are different categories of drought characterised by their impact:

- meteorological drought
- agricultural drought
- hydrological drought
- water supply drought.

Meteorological drought happens when we experience continued dry weather in an area, while agricultural or soil moisture drought occurs when soil water levels drop, and

Verity Jones, Lucy Gorell Barnes, Lindsey McEwen, Sarah Whitehouse and Sara Williams describe their resources for raising awareness and encouraging positive water behaviours among young children

reduced access to water affects crops. Hydrological drought manifests when streams, rivers and reservoirs become low or dry up. Finally, water supply (or socio-economic) drought is when supply to industry (including agriculture), business and homes is restricted. This level of severe, formally announced drought is perhaps best remembered during the 1975/76 heatwaves in the UK, when people still recall collecting their rations of water from standpipes and listening to ABBA as they were blasted by the sun. Forty-five years on, the population may be forgiven for thinking that drought does not happen in the UK. However, due to its hidden nature and slow build-up, often over many months, in comparison with its meteorological opposite, drought cannot compete with the sudden and very visible impacts of floods in either the media or memory.

Over the last five years, large-scale research projects have been funded to consider the UK's past, present and future drought risks and their impacts across sectors including the public/communities. It was hoped that this would provide new evidence to support improved decision-making about drought-risk management. From the start, the aim was to ensure all stakeholders in communities had opportunities to learn from the research and young people were a key group in this.

The DRY project

The DRY (Drought Risk and You) project brought together our multidisciplinary team to create a research-informed storybook and teachers' notes for 7- to 11-year-olds. The free e-picture book, *DRY: the diary of a water superhero* aims to raise awareness and bring focus to positive water behaviours. This



Figure 1 Find the weather clues in September's diary entry. Courtesy of Luci Gorell Barnes.

recognises water as a finite resource, needing efficient use, and at the same time promotes drought awareness – preparing for UK drought. Our evaluation of this resource has found that the story, constructed around diary entries through a school year from the perspective of an 11-year-old girl in a city somewhat like Bristol, has the potential to not only increase knowledge and desire to

make changes for learners, but also their teachers. This article takes a brief look at the book and reflects on what teachers, trainee teachers and learners had to say about it. For more detail, see Jones *et al.* (2021).

The digital collages created by Luci Gorell Barnes are immediately eye-catching, and in the classroom they offer opportunities to explore learners' visual literacy. Through

lesson observations, surveys and interviews with trainee and qualified teachers, we found that the layered details allowed learners to play games such as *I Spy*. For example, who can spot evidence about what the weather is like from the picture in Figure 1?

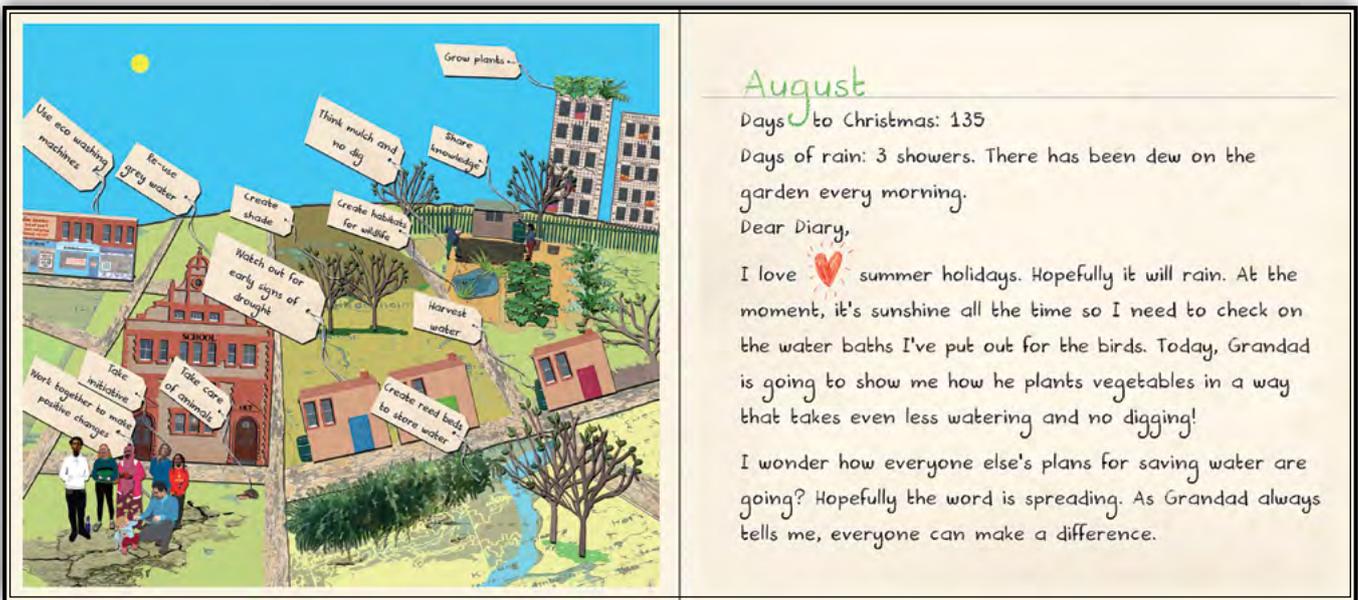
Not only are there clues in billboard posters and clear blue skies, but look more closely and you will find plants that are drooping and going brown in pots, desiccation cracks underfoot where the soil has become so dry it has begun to crack, wildlife 'talking' about how the weather is affecting them and gentle reminders about some of the ways we use and need water (in this instance, the laundry reminding us of water needed to wash clothes).

All users of the book noted that their knowledge about water use increased after reading it. Of particular interest to many was the idea of 'embedded water' in products we don't think about as having any connection to water (Figure 2). Here, the complex idea of a water footprint is introduced by giving our protagonist metaphorical 'water goggles' for Christmas. These goggles allow her to see just how much water is needed in the production of her festive lunch.

8- to 11-year-olds in focus groups talked about how recognising



Figure 2 How much water has been used to produce the Christmas lunch? Courtesy of Luci Gorell Barnes.



embedded water really made them think about their own actions. In conversations, we heard personal commitments being made to try not to waste food, drinking water at meal times rather than throwing it away and turning taps off when brushing teeth. Adults talked about how the book made them consider their diet (eating a diet with meat having a larger water footprint than a vegetarian diet), the desire to purchase a washing-up bowl (which uses less water than washing up in a sink alone), and the need to fill the washing machine rather than putting on half or less than half loads.

By August, and the final diary entry, our protagonist has been on quite a journey (Figure 3). She has discovered new knowledge about water needs and use, and had

different levels of success in trying to change the behaviours of her family, school and local community. She has also explored different options for adaptation, working out from the home to the wider community. By the end of the book, young people told us that they felt really positive. At points in the story, they had felt anger towards those who were not listening to the girl's plea for change, but recognised that with the help of others, small changes could be made that would contribute to larger changes at ever greater scales.

Summary

In order to support young learners in adapting to changes in climate and the increasing threat of water scarcity in the UK, we need resources that encourage conversations and thinking around these issues. The free

teachers' notes for the DRY project provide a host of ideas of how to link the themes from the book with cross-curricula learning, and we hope that this combined resource will be useful to teachers and learners alike.

The evaluation of this resource is ongoing; if you use this free e-book, please consider filling in the quick online survey!

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Resources

Free e-book, *DRY: the diary of a water superhero*: https://issuu.com/uwebristol/docs/dry_the_diary_of_a_water_superhero

Free teachers' notes: <https://dryutility.info/wp-content/uploads/2020/01/DRY-book-Teachers-Notes-FINAL-E-VERSION.pdf>

46 simple information cards produced by the DRY project can be found here: https://issuu.com/uwebristol/docs/water_drought_and_you

Link to survey evaluation for teachers / educators using the book: <https://dryutility.info/survey>

References

Jones, V., Whitehouse, S., McEwen, L., Williams, S. and Gorell Barnes, L. (2021). Promoting water efficiency and hydrocitizenship in young people's learning about drought risk in a temperate maritime country. *Water*, **13**(18), 2599. Available at: <http://dx.doi.org/10.3390/w13182599>

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