

# Water Quality - Importance and Regulatory Settings

## Part A: Water quality - definitions and importance

*The material presented here has been prepared by Samuel Addison in April 2021, with input from Dr. Laura Richards and Prof. David Polya of the Department of Earth & Environmental Sciences, The University of Manchester, and other sources as acknowledged. The associated video recordings have been made by Samuel Addison.*

*The Transformation by Innovation in Distance Education (TIDE) project is enhancing distance learning in Myanmar by building the capacity of Higher Education staff and students, enhancing programmes of study, and strengthening systems that support Higher Educational Institutions in Myanmar. TIDE is part of the UK-Aid-funded Strategic Partnerships for Higher Education Innovation and Reform (SPHEIR) programme ([www.spheir.org.uk](http://www.spheir.org.uk)). SPHEIR is managed on behalf of FCDO by a consortium led by the British Council that includes PwC and Universities UK International. The TIDE project will close in May 2021.*



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  - Introduction to water and water quality
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The overall aim for this lesson is to introduce and focus on what water and water quality is, look at why water quality is so important and look at its importance within the context of sustainable development goals.

- To be able to define water quality
- To be able to compare various uses of water and why they may have different water quality requirements
- To be able to discuss reasons why water quality is of importance

# **INTRODUCTION TO WATER AND WATER QUALITY**

# What is water?

- ‘Water’ is the name of the liquid state of H<sub>2</sub>O. A compound of hydrogen and oxygen
- Water has many important properties- one of these being it is an excellent solvent, so it can contain lots of substances
- Water is essential to life



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- Water is used by humans everyday
- It has multiple uses that we use it for each day:
  - drinking
  - washing
  - cooking
  - and many more...



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# Not just H<sub>2</sub>O

- As water is an excellent solvent, substances easily dissolve in water.
- Water in nature is not pure
- Naturally, contaminants, minerals, microbes and pathogens are all found in water
- These substances can impact our use of water



- Different uses of water have different priorities for their ideal water quality characteristics
- Typically, the use that has the most stringent classification is drinking water
- For drinking water, the primary concern is human health.

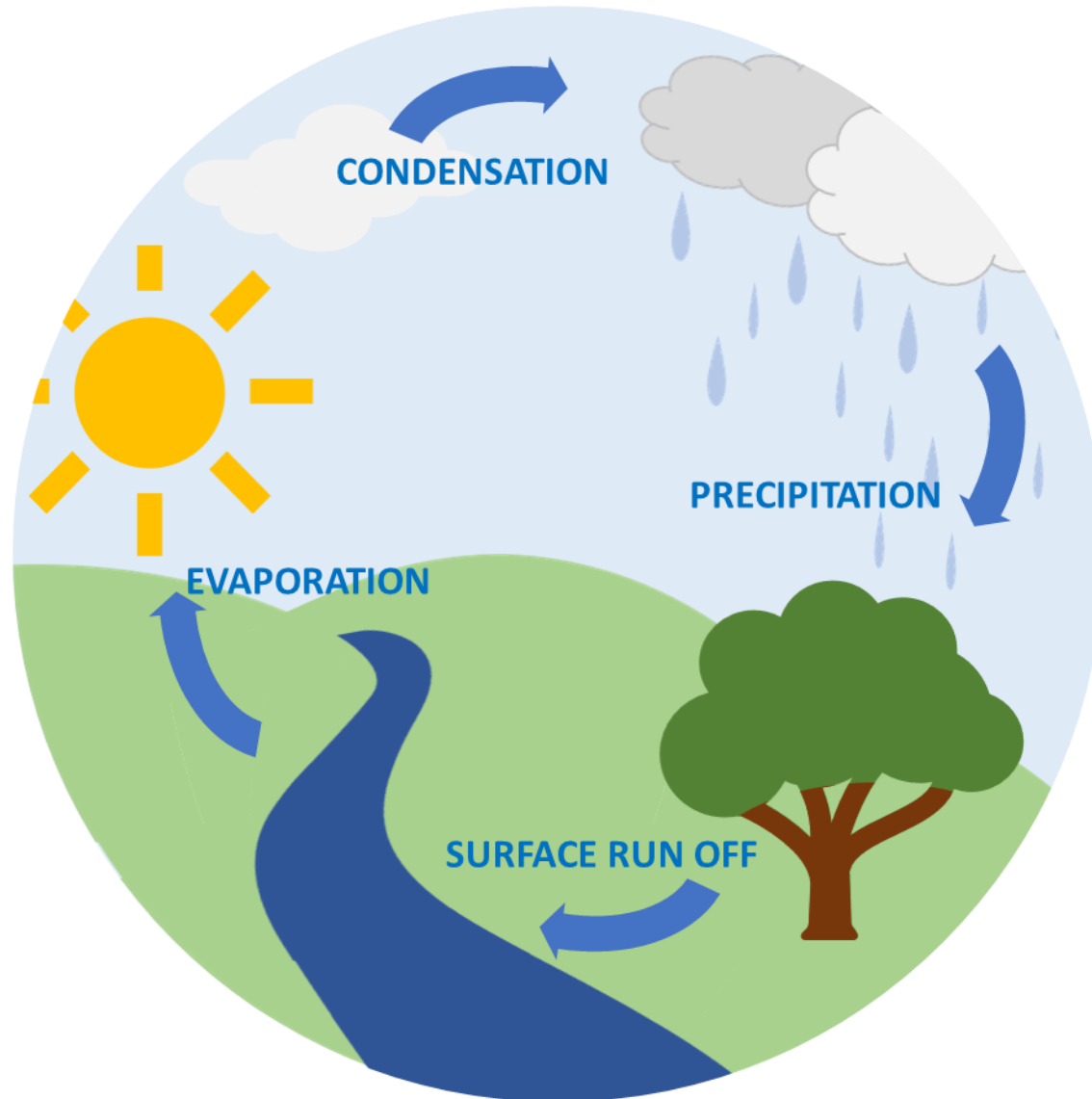
- Water quality describes the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose
- The uses of water we define water quality for include drinking, washing or even for aquatic life to live in



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# THE WATER CYCLE

# The water cycle process



- The water cycle highlights the movement of water through the earth system.
- There are many detours along the way and these expose the water to impurities that impact water quality
- The water cycle also naturally cleans the water aswell. When water evaporates from lakes or the ocean, it leaves impurities behind.

# **THE IMPORTANCE OF WATER QUALITY**

- UN has set out sustainable development goals
- Goal 6 – Clean water and sanitation



[https://en.wikipedia.org/wiki/Sustainable\\_Development\\_Goals](https://en.wikipedia.org/wiki/Sustainable_Development_Goals)  
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- Water is at the core of sustainable development
- Water quality is strongly linked to SDGs, focusing on the sustainability of water use for future generations.
- Importantly, water is not just an issue of SDG-6, but also to SDG-2 on food security, SDG-3 on human health, SDG-11 on resilient cities and SDG-15 on protecting ecosystems and conserving biodiversity.



- Water can have a significant effect on human health
- The World Health Organization estimates that 829 000 people die each year from diarrhoea as a result of unsafe drinking-water, sanitation, and hand hygiene [1]
- Millions of people in S/SE Asia are exposed to arsenic in groundwater which has been termed the largest mass poisoning in history [2]

[1] <https://www.who.int/news-room/fact-sheets/detail/drinking-water>

[2] Smith, A.H., Lingas, E.O. and Rahman, M., 2000. Contamination of drinking-water by arsenic in Bangladesh: a public health emergency. *Bulletin of the World Health Organization*, 78, pp.1093-1103.

- Water quality has an impact on the food chain
- The impacts on the food chain can lead to impacts on many animal species
- The impacts on ecosystems can also lead to us through the food we eat



[https://ocw.un-ihe.org/pluginfile.php/3987/mod\\_resource/content/1/OCW-WQA-2016-Lecture-Notes\\_WQA1\\_Introduction-def-4.pdf](https://ocw.un-ihe.org/pluginfile.php/3987/mod_resource/content/1/OCW-WQA-2016-Lecture-Notes_WQA1_Introduction-def-4.pdf)

- Depending on local situations improved water quality can lead to improved productivity
- Improved water quality leads to less expenditure on health
- Children can gain increased school attendance which has effects on the rest of their lives

# SUMMARY

Water quality describes the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose

Water quality can be intrinsically related to our health, ecosystems, educational attainment and economic productivity

As our understanding improves over time, it can change what we view as 'good' or 'poor' water quality

Whilst SDG-6 specifically focuses on water, SDG-2, SDG-3, SDG-11 and SDG-15 all link to water

# LEARNING EXERCISE

- List the reasons why you may use water in a typical day.
  - Think about how you use the water for the particular purpose and how different water characteristics may impact on each purpose.

# **REFERENCES & FURTHER RESOURCES**



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<https://www.unwater.org>

The united nations' website for water provides access to lots of information about water and water quality.

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