Introduction Water Conservation Labs

Engineering Statistics I (MA223)

This document provides the instructor with a framework for introducing the lab. This is not for distribution to the students.

Start with the following video:

- Video on Water Distance (https://youtu.be/yRXmG1nBKiA?feature=shared)

Using this video, have the following discussion:

- When we think of water, do you view it as a fixed resource, why or why?

"The 2030 Agenda for Sustainable Development, adopted by all United Nations (UN) Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future."[1] The agenda describes seventeen goals for sustainable development (SDGs), the sixth being "clean water and sanitation":

> UN SDG 6: Ensure availability and sustainable management of water and sanitation for all.

The UN infographic for the clean water goal (Figure 1) summarizes the need for water conservation and management. For many of us, access to clean water is something we take for granted. However, "37% of countries are experiencing high to extremely high levels of water stress."[2] This means that the demand for water exceeds the supply.

Given the concerns about water, we introduce the idea of a water footprint and water conservation with the following video:

[1] https://sdgs.un.org/goals
[2] https://mcic.ca/uploads/public/files-sf/SF-Full-FINAL-WEB-ISBN-2021-EN.pdf

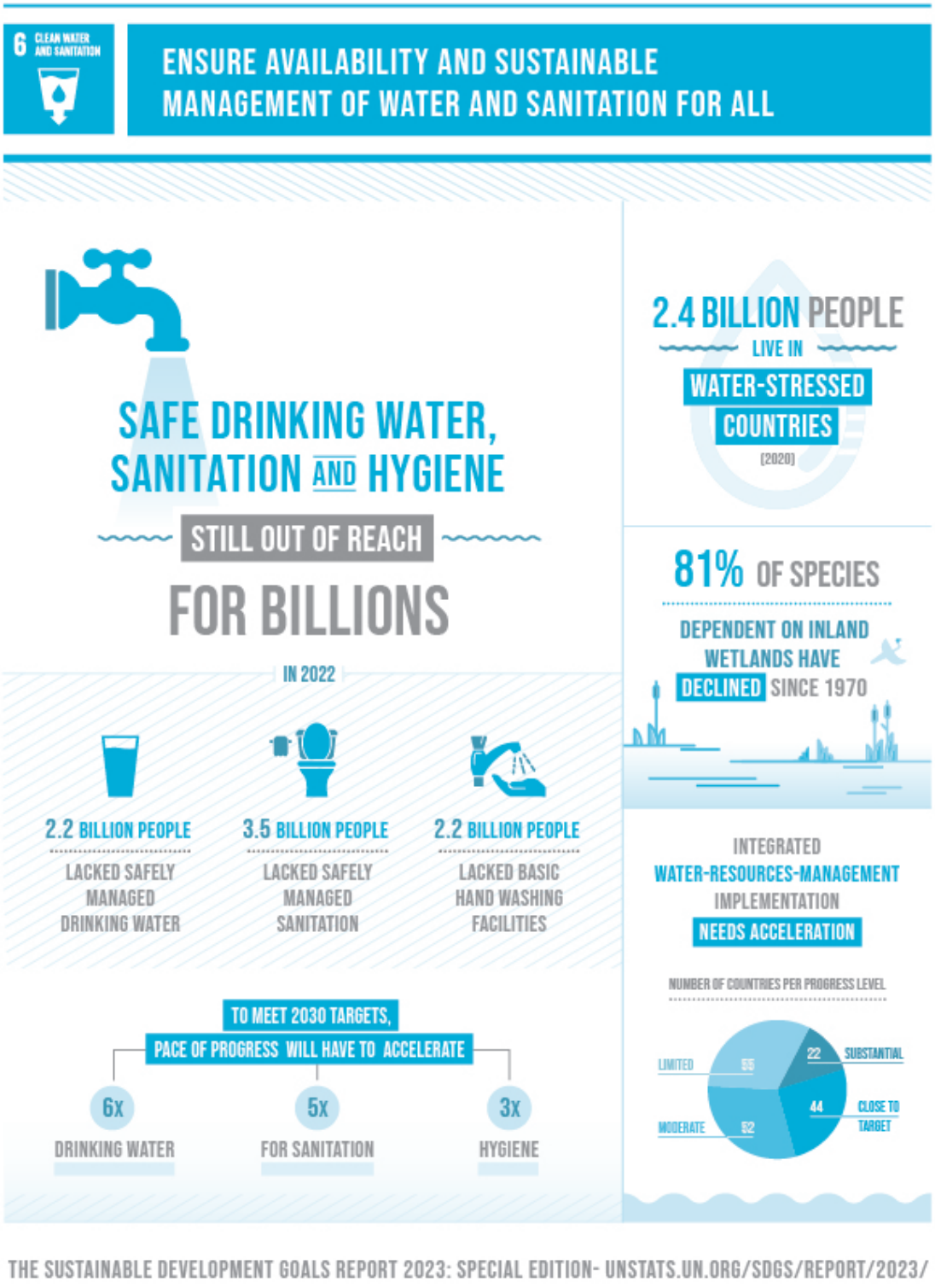

Figure 1: UN Sustainable Development Goal 6

- National Geographic Video (https://youtu.be/2T_n0oi9YdY?feature=shared)
- **Stop video at 1:27.**

Using this video, have this discussion:

- What things are important to managing water use?

Improving water resource management therefore requires us to consider water conservation. **Before we can conserve water, we must understand current trends and patterns in water consumption.** When asked to estimate personal water usage, our first instinct is to consider the amount of water we drink, use in cooking, bathing, cleaning clothes, flushing toilets, and maybe watering the lawn. However, the largest chunk of our water consumption is indirect, through the products we purchase and the food we consume; this is known as "virtual water,"[3] and plays an important role in understanding our true water footprint.

Our labs this term will investigate trends in the water footprint of members of our community. While the data we collect is at the individual level, understanding the water footprint of individuals allows us to characterize the water footprint of a larger community, and it is at this level that changes can have a significant impact.

Final discussion:

- How do you approach collecting data about individual water use within a community?

While you might imagine some sensors, assessing water use within a community will require a survey.

- What are the pros/cons of a survey?

Surveys are quick and easy to implement, but they do require individual "recall" on behavior. It will naturally have some "error/variability" due to memory. But, they also give you a sense of personal beliefs about a behavior.

[3] https://www.watercalculator.org/footprint/what-is-a-water-footprint/