

Activity 6: Water Management

Description

Water management is very necessary but adults that are not actively involved or studied the subject have little knowledge about challenges and techniques to solve them. Water management requirements done through laws appear to regular people as absurd or unnecessary because they do not know the logic behind.

Polluted water is toxifying the planet and harming people. Caused by :

- Agriculture which pollutes groundwater
- Automobiles whose emissions pollute clouds
- Industry polluting air, soil and water
- Salinization caused by deforestation, rising water tables & agricultural watering
- Bottled water and cement are taking water out of the hydrologic cycle
- Erosion is a natural process that moves water, nutrients and resources.

Erosion can disturb existing systems and may replenish water sources, spread nutrients and feed life. Consider reducing erosion by storing or directing water, reinforcing soil with plants or physical materials.

In the following 'learning-by-doing' team game participants will have the chance to explore water management challenges and mitigation techniques.

Teaser activity

Ask the participants to read the text and react with 3 emojis:

70% of our Earth's surface is water

93.8% is ocean water, 2.5% is fresh water

0.375% is accessible to humans

0.3% of water is in lakes & ponds

0.06% is in soil & forests, 0.03% is in rivers, 0.035% is in the atmosphere.

- Sources of water in the environment: 13 percent of precipitation is rain

86 percent of precipitation is from condensation of sea air, mists & fog

Who uses all the water? 85% agriculture, 7.5% industry, 7.5% domestic & residential

- 26% from toilet flushing, 17% from showering, 15% from taps, 22% from washing cloths, 14% by sub surface leaks and 5% from other uses

Industry uses

62.7 litres (16.5 gallons) of water to make 1/3 litre (12 ounce) can of soda

70 litres (18 gallons) of water to grow one apple

120 litres (31 gallons) of water to make one glass of wine

7900 litres (20,86 gallons) of water to make one pair of shoes

73,700 litres (19,469 gallons) to raise a cow to 18 months of age

(Stats from www.grandforks.ca)

- In the west, 100 litres (26 gallons) of water for an average shower or average day of flushing the toilet

350 litres (92 gallons) of water is average use per person per day

(Stats from www.epa.gov)

- 1.8 million tonnes (4 billion pounds) of trash per year comes into the ocean, killing one million sea birds and 100,000 marine animals annually

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Competences addressed

Ecological competences:

- Development of documentation skills
- Demonstrating an understanding of the consequences of one's behavior in relation to the environment
- Demonstrating an ecological way of thinking in making decisions
- Understanding the importance of water management for environment preservation.
- Developing a proactive attitude towards applying water management techniques in their home community.

Social competences:

- Ability to collaborate with specialists in other fields.
- Developing interpersonal relationships and strengthening the skills needed for teamwork.
- Ability to appreciate diversity and multiculturalism
- Stimulating creativity and developing a competitive and innovative spirit, as well as teamwork.

Learning objectives

- Training and cultivating adults' interest and responsibility for water management.
- Promoting and stimulating healthy behaviors towards the elements of the environment.
- Empowering adults to decrease water pollution in their community and to engage in water cleaning and reuse.
- Stimulating the critical and self-critical spirit regarding the attitude towards water management.
- Increase knowledge about water management techniques

Group characteristics

Activity to be done preferably in groups of 4 to 6 trainees.

Preparation for the activity

Prepare 4 islands contours drawn on flipchart papers.

You need to give paper and coloured pens/markers to the groups of trainees you train, plasticine and cardboard.

The trainees need access to internet or pictures and articles about the water management techniques.

“Water friends” stickers for the end of the game, for each participant.

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The activity / the content

The trainer reads the storytelling scenario:

“As a consequence of climate change, your city near the water is now submerged. You escape with members of your community on 4 ships, bringing as much materials and resources you can with you.

During your voyage, winds separate the ships, that end up on four different islands”

The participants are split between 4 groups, with the following scenarios for water challenges for each island:

- **Island 1: Drought** – It’s summer, it’s extra hot and it has not rained in over 2 months. There are water restrictions, not allowing garden watering. What techniques can you use to ensure your plants can remain healthy and resilient?
- **Island 2: Water contamination** – there has been oil activity in your area. You notice the water tastes funny and animals have been getting sick. You suspect water contamination. What techniques can you use to keep the water in your area clean and safe?
- **Island 3: Flooding** – It’s a warmer spring than usual and there is more run off from the mountains than expected, causing devastating flooding. What techniques can you implement to handle extra water flow during these historical weather events?
- **Island 4: Soil erosion** – you live in a climate with heavy rain. In sloped areas, especially in the deforested area, there is mass soil erosion and your landscape is being depleted. What techniques can you use to restore the soil to avoid more soil erosion?

Participants water challenge and 2-3 techniques and are asked to consider their scenario and to create a design that solves their challenge using the techniques they are given:

- **Island 1: Drought** – Dew collection, Rain Tanks and Cisterns.
 Dew collection: is primarily used in dried or arid environments and can provide much of a system’s water in these conditions. High humidity and low cooling temperatures create the best yield for dew collection.
 Rain tanks and Cisterns: used to catch water from different sources, mainly from roofs. Tanks should be level and if possible, raised for water pressure. A first flush system is recommended with roof water catchment.
- **Island 2: Water contamination** – Gray water treatment, Rain garden
 Gray water treatment: effective for cycling, cleaning water and flushing nutrients into your agricultural systems. There are a series of phases, including filtration, settling, aeration and UV exposure.
 Rain garden: Low cost and low maintenance systems used for water capture and filtration. Typically built on a higher part of a property and connected to a downspout or a gray water system.
- **Island 3: Flooding** – Flow through dam, Swales
 Flow-through dams are built solely for flood control and are used to protect against flooding in downstream areas. Because this type of dam is built solely for flood control, the opening (spillway) is at the same level as the riverbed. This means that when there isn’t excess water, the river will continue its natural flow. However, when water levels rise, the dam slows the water flow through the opening to prevent flooding.
 Swales: a level ditch on contour with planted downhill berm intended for catching overland flow and infiltrating into the ground to recharge the surrounding soils, plant root systems and aquifer.

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- **Island 4: Soil erosion** – Reforestation, keyline design
Reforestation: Trees effectively condense water from the air at night and increase air humidity, cloud formation and rain. Tree roots also help reduce erosion during heavy rain and flooding events.

Keyline design is a landscaping technique of maximizing the beneficial use of the water resources of a tract of land and prevent erosion. The "keyline" denominates a specific topographic feature related to the natural flow of water on the tract. Keyline design is a system of principles and techniques of developing rural and urban landscapes to optimize use of their water resources.

- Participants are encouraged to use illustrations on their flipchart papers, make 3D sculptures with plasticine or use other creative means to share their designs.
- Players can also trade techniques with other groups and are welcomed to use their own elements in addition to the ones they were given.

In the end we do a "gallery walk" with everyone to visit each group's design. Participants can become teachers, sharing their essential learnings and the techniques they used to the whole group.

At the end of each presentation, the participants receive "Water friends" stickers.

Questions for reflection, self-assessment and conclusions

- What did today's activity consist of?
- Would you have liked to be on another island? Why?
- Do you have any other solutions for other islands?
- How can we apply what we have learned in our daily lives? Which scenario is relevant for your home region?

Recommendations on how to adapt to different target groups

If the group doesn't have a lot of time available, only one of the steps of the tool can be performed.

References

Permaculture Design.

<https://www.permaculturedesign.ca/>