Motivation for water conservation and water solidarity

This module gives you a chance to understand and bond with the rivers and lakes of your community. Discover your relationship with water and how the impact of human activities on water affects your own life along with the life of many other beings. This module will help you to clarify what you and your friends care about, and thereby what can be your specific contribution to water conservation and the Big Jump Challenge.

Module Instructions

This module seeks to create a space for introspection and discussion of the most important reasons to care about water conservation and water solidarity. You can use a whiteboard or alternatively print-outs to trigger the discussion. You will need approximately two hours for this module.

Step 1: Warming up

Start your session with some introductory questions to focus the group's attention on the values of water in society. Participants should be able seek the answers for themselves. (The answers are provided in the Appendix of this module.)

1. How long could you survive without water?
2. How long could you survive only with water?
3. How much water do you have in your body?
4. What is the global amount of fresh water?

Step 2: Human action and water conservation

In this step, move the group's attention how our actions relate to water conservation in rivers and lakes. A before-after scenario is provided as a simplification, with a river before human modification and after modification with a dam for hydropower. This example is offered because hydropower is one of the critical issues in water conservation (for a current example of this conflict, see Save the Blue Heart of Europe Campaign www.balkanrivers.net). *Please note: each river or lake is different! If a different scenario is more appropriate for your river or lake, please adopt a different scenario! Alternatively, you could also show a film to start the discussion (see links below).*

Present to the group the river before modification, and discuss what you see (see graph 1 below). Explain to the group that this is a thought experiment about their river – it simplifies things in order to promote discussion. Then discuss what you see when the river is modified with a dam for energy production. For example, prior to pollution, a river can be used for swimming, but after being polluted, no one goes close to it.

Background information is provided in the Appendix so that the group coordinator can understand the sketch, however, the group should come up with the meaning or story behind the illustration. Let them explore the scenario for themselves, giving hints when necessary. Ask them what further examples come to mind of negative human impacts on water systems.

Once the scenario has been discussed, ask the students to identify which beings they care about. Who is affected, and in what way? Who is especially important to them, and who do they think should be considered?

In terms of ethics, your goal is to invite a discussion of values and moral perspectives:

1. Humans and how they are immediately dependent on freshwater for their well-being (drinking, food production, health, recreation, energy etc.). Humans directly in the river basin (“us”) and humans that are further away either in space (for example people downstream, who may have less water due to a dam or irrigation upstream) or in time (future generations, who may no longer have access to a river ecosystem in the same way).
2. Animals in the river, in floodplains and in the river basin more generally.
3. Plants in the river, in floodplains and in the river basin more generally.
4. The river ecosystem as such, with all its living and non-living entities, and their interrelation.

In environmental ethics, these four perspectives are associated roughly with anthropocentrism (care for human beings), sentientism (care for all beings capable of suffering and experiencing well-being), biocentricism (care for all living beings) and holism (care for all entities), respectively.

What are the moral sentiments in the group? You could note the discussion inputs on your blackboard/drawing board as your “map of care”, for example via a river basin scenario that highlights various moral subjects.

Finally, based on this “map of care” of your river or lake, ask the participants if there is any reason not to care about humans, animals, plants and ecosystems in other river basins. What are reasons for water solidarity, i.e. the willingness to care for the problems others face; why should we do something with others or in support of others even if they belong (at least at first sight) to a different community? You could focus on:

a. A physical connection between groups via a river (upstream and downstream)
b. A shared political and economic unit of cooperation (such as the EU)
c. A shared humanity or a shared sense of being a living being
d. A sense of respect or reverence for nature and its rivers and lakes as such

Step 3: Final collection

Collect the main reasons why your group cares about its river or lake, and why it cares about rivers and lakes in Europe. Collect the open questions you have with respect to your river, as well as rivers and lakes in Europe. These could be further questions about your process of reflection, they could also be questions of fact that you are still unclear about, where you need to find out more (for example about the well-being of fish in your river).

Appendix:

Step 1: Short Questions

How long could you survive without water?
→ 3 days

How long could you survive only with water?

→ 4 to 6 weeks

How much water do you have in your body?

→ The amount of water in the human body ranges from 50-75%. The average adult human body is 50-65% water, averaging around 57-60%. The percentage of water in infants is much higher, typically around 75-78% water, dropping to 65% by one year of age.

Body composition varies according to gender and fitness level, because fatty tissue contains less water than lean tissue. The average adult male is about 60% water. The average adult woman is about 55% water because women naturally have more fatty tissue than men. Overweight men and women have less water, as a percent, than their leaner counterparts.

The percent of water depends on your hydration level. People feel thirsty when they have already lost around 2-3% of their body's water. Mental performance and physical coordination start to become impaired before thirst kicks in, typically around 1% dehydration.

Although liquid water is the most abundant molecule in the body, additional water is found in hydrated compounds. About 30-40% of the weight of the human body is the skeleton, but when the bound water is removed, either by chemical desiccation or heat, half the weight is lost.

Source:www.chemistry.about.com/od/waterchemistry/f/How-Much-Of-Your-Body-Is-Water.htm and www.water.usgs.gov/edu/propertyyou.html

What is the global amount of freshwater?

→ Over 70% of our Earth's surface is covered by water (we should really call our planet Ocean instead of Earth). Although water is seemingly abundant, the real issue is the amount of available freshwater.

97.5% of all water on Earth is salt water, leaving only 2.5% as freshwater

Nearly 70% of that freshwater is frozen in the icecaps of Antarctica and Greenland; most of the remainder is present as soil moisture, or lies in deep underground aquifers as groundwater not accessible to human use.

< 1% of the world's freshwater (~0.007% of all water on earth) is accessible for direct human use. This is the water found in lakes, rivers, reservoirs and those underground sources that are shallow enough to be tapped at an affordable cost. Only this amount is regularly renewed by rain and snowfall, and is therefore available on a sustainable basis.

Source:www.globalchange.umich.edu/globalchange2/current/lectures/freshwater_supply/freshwater.html

Step 2: river modification scenario

Scenario before modification

This is a simplified scenario. Graphs and texts are adapted from www.dameffects.org/index.html. For further information visit the hydropower reform coalition homepage (see the power point for a dynamic version of the graphs).

Riparian areas: often these lands are extremely productive and biologically diverse due to the presence of water. Tree-lined banks are a source of shade and refuge for wildlife. Grassy wetlands help filter water and slow the river, while sandy bars provide a gentle slope to wade into the water. All of these lands act as a buffer to outside pollution.

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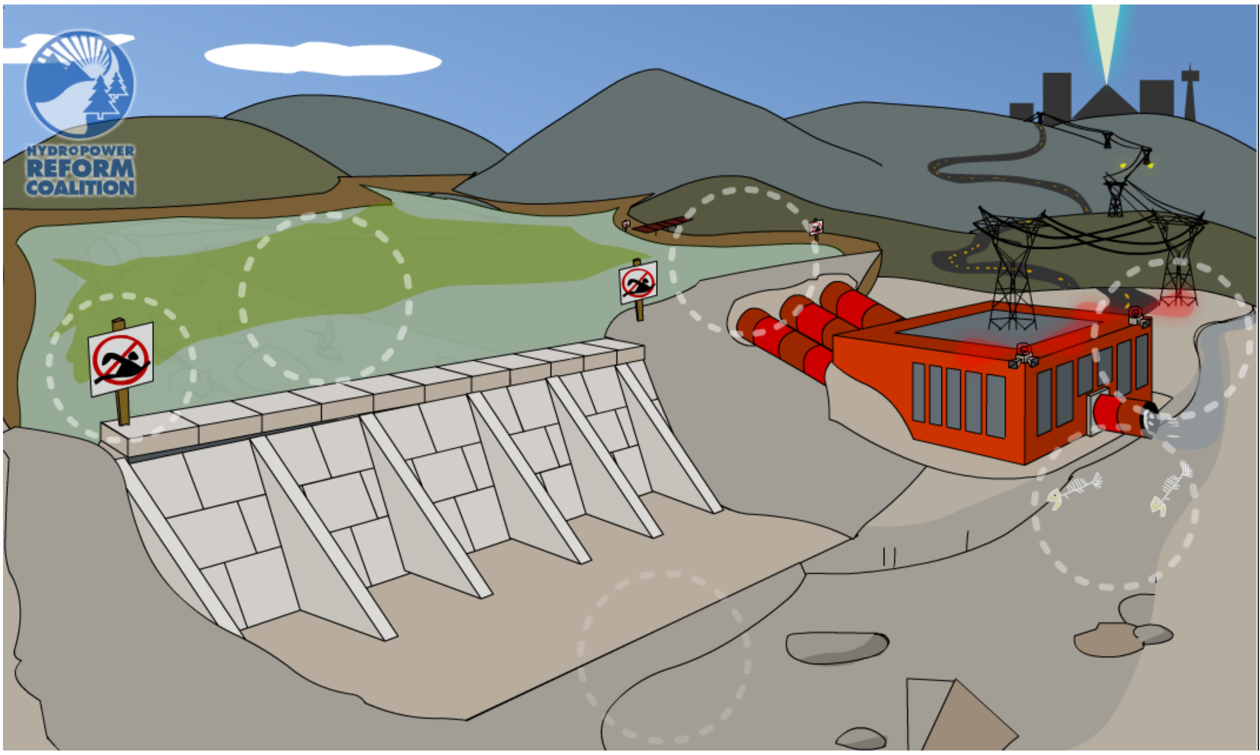
Fish passage: in a free-flowing river, animal species can move upstream and downstream. Migratory fish like salmon use extensive reaches of the river for habitat, meaning long reaches can contain one interlinked population. Some freshwater mussels attach to fish and move upstream to find new habitat, contributing to ecosystem-wide diversity and the greater food chain.

Recreation: a natural river supports several types of unimpaired recreation.

Sediment and debris: rocks, fallen trees, pebbles, branches and sand move downstream under the force of flowing water and settle out to form patches of diverse habitat. Submerged gravel beds make a home for insects and small creatures, which form the base of the food chain; these beds also act as spawning grounds for migratory fish like salmon.

Natural river flow: river flow volumes can vary widely from stream to stream and season to season, and their variability is an indispensible part of how a river's banks push out built-up debris in the channel and flush the system with high-quality water. The life cycles of many river species have evolved to match the timing of high and low flows, and so seasonal events like high springtime flows trigger new phases in their lives.

After modification with hydropower-dam:



Recreation: a dammed river eliminates the prior recreation experience and offers new, artificial recreation. Now flat water recreation can exist on a reservoir, facilitating activities like power boating. Access to the river is often reduced, and the weakened river supports fewer sustainable wild fish populations, which can affect fishing opportunities, if they were allowed before.

Water quality: two of the most common water quality violations from hydropower dams are temperature and dissolved oxygen (DO). DO helps fish breathe. But when organic materials that have built up behind the dam start to decompose, they consume the limited oxygen. The lowest levels in the reservoirs become dead zones, lacking enough oxygen to support river life. This decomposition can also foster algae growth and blooms, a toxic development for river life.
In the summer, temperatures can be unnaturally cold on the bottom of a reservoir and too warm on the surface. In the winter, deep water can be unnaturally warm. The dams then release oxygen-deprived water with unnatural temperatures into the river below. Also, if the dam releases too little water, the reduced river is easily made too warm by the sun.

Riparian areas: as hydropower dams generate power, they alternately release and hold water in pushing, unnatural ways. These released flows have dramatic effects on upstream and downstream lands. The original riverbanks are underwater in a dammed river, so the riparian riverside lands are now functionally shoreline.
Upstream, the shoreline is stripped as the reservoir bobs up and down, causing what look like bathtub rings. Downstream, unnatural changes in flows can erode banks or result in the growth of shrubs and trees in the riverbed. Downstream erosion occurs much faster than in a natural river system because structural materials like wood and sediment are trapped behind the dam.

No debris or sediment transport: as a river moves downstream, rocks, wood, sand and other natural materials travel with it. In a dammed river, the materials are blocked. As the river encounters the reservoir, it slows down, losing its forward momentum. Sediment and debris drop at the mouth of the reservoir and fill it up over time.
Dams in sandy rivers have short useful life spans before their reservoirs are full of sediment instead of water, sometimes called “silted in”. Additional materials from eroded banks pile into the reservoir. Downstream of a dam, the river is starved of its structural materials and cannot provide habitat. The water washes away finer sediments, leaving a scoured riverbed below the dam.

Fish passage: a dam breaks a river in two. All river life is split into upstream and downstream populations, no longer mixing throughout the entire river. Most dams do not simply draw a line in the water; they eliminate habitat in their reservoirs and in the river below. For migratory fish like salmon or shad, dams block the way home. Resident fish are fragmented into isolated groups, reducing genetic diversity and range. This can lead to unhealthy inbreeding and population nosedives.

Unnatural river flows: hydropower dams manipulate the natural river to generate power. Some dams generate power during "peak" operations. This means that the dams "turn on" the river in the morning, and then "turn off" the river at night to store water for the next day. Many hydropower dams have plumbing systems that reroute the river's water through pipes instead of the natural riverbed in order to gain additional pressure. The result is a "bypassed" river that is de-watered or even dry for miles.

Note: If you have the time, discuss practical ways of dealing with dams, such as further modification like fish stairs to improve the ecological quality for fish, or dam removal/decommissioning if the ecological damage is too high or if the electric power provided is insignificant. For a discussion of these possibilities see again www.dameffects.org/index.html.

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