

SOCIAL AND TECHNOLOGICAL INNOVATION FOR WATER CONSERVATION *THE PROJECT ECH2O-ÁGUA*



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BASED ON THE ARTICLE OF THE SAME TITLE BY:

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ECH2O ÁGUA – THE PROJECT CONTEXT AND AIMS

- The ECH2O-ÁGUA is being developed by the Portuguese Association of Water Resources (APRH), with the objective of promoting the adoption of practices of responsible consumption and efficient use of water, in order to meet the household and school/professional environment and needs, in a sustainable way.
- In a context of problems of water scarcity worldwide and drought phenomena, APRH aims to contribute to a more informed and conscious society regarding the responsibilities and changing potential towards a paradigm of governance of water towards the Sustainable Development Goals (SDG).
- The project is developed through the mobilization of experimental communities that are testing devices for more sustainable use of water. It is intended to cover a various range of ages and profiles (children, young people and adults) and promote the testing of the new equipment.
- An electronic application for mobile phones and tablets is being developed to calculate the individual Water Footprint. The results for a critical and informed choice of different technological options inherent in consumption patterns can be achieved through the direct involvement of citizens in the changes in the patterns of consumption at local level through experimentation.
- By promoting social innovation and technological innovation, we promote a durable influence and sustained patterns of production and consumption, within a circular economy perspective.

ECH2O – ÁGUA WEBSITE: ECH2O – ÁGUA WEBSITE

<http://www.aprh.pt/ech2o/>



**UM ÚNICO PLANETA
PARA TODOS**



Projecto

Atividades e
Documentação

Pegada
Hídrica

Comunidades
Experimentais

Parceiros

Contactos

WATER AS A PUBLIC GOOD AND A HUMAN RIGHT

- There is a need to properly frame the water problems that currently stress several regions and populations of the world, with particular incidence in urban areas.
- Firstly, regarding the 'nature' of water resources that are used in the urban water cycle. The European Union Water Framework Directive (WFD) established in 2000 that "Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (*point 1. Of the preamble of WFD legal text*).
- In 2010, the UN officially recognized a "human right to water" which entitles everyone, without discrimination, to sufficient, safe, acceptable, physically accessible, and affordable water. This includes personal and household hygiene purposes (accessible and affordable water for personal and domestic use, drinking, personal sanitation, washing of clothes, food preparation, etc.) as essential for a person's full enjoyment of life and all other human rights in dignity - stated by the UN in 2010 and reinforced in 2019.

WATER AS A SOCIAL ISSUE

- **Adopting an integrative approach of the issue, many researchers in social science argue that the water-energy-food security nexus debate is not exclusively about ensuring sufficient clean water delivery and sanitation and hygiene (WASH) services to people.**
- **It must also respect the socio-cultural aspects of the water resources to be sustainable, socially acceptable and even empowering, as it enables people to develop their personal capabilities.**
- **Water is much more than what we drink or use, it is also related to soft factors such as values and social structures. The latest UN World Water Development Report illustrates this relational framework of the hydro-sociocultural cycle in the context of gender equality with numerous examples. Everywhere it bears cultural and social specificities, clarify roles and structure habits.**

ECH2O-ÁGUA: THE CONCEPT AND PRAXIS

- The participative elements of ECH2O-Água are established to start a process of understanding and discussing what one (or the group) holds to be true. When sharing expert knowledge and advice on sustainable use of water, the project guides this reflexive process and nourishes it with content.
- Changing consumer habits is not only about informing about the current and future critical states of the environment, but also about developing a strategy to achieve widespread social acceptance and deeper understanding of the scientifically agreed-on problems, as well as on technological devices that help achieve the goals, in order to trigger change and awareness towards more sustained behaviours.
- Actions are directly linked to values, which is why any project working on social awareness of environmental issues needs to make sure it activates positive frames of human responsibility to nature, including other human societies. Interactions between connected ecosystems need to be explained as they sculpt how we perceive the world we live in, which then influences to what extent we are willing to take care of it, as emotional involvement is proved to shape awareness and attitude.

WATER IN THE URBAN CONTEXT

Assumptions:

- The need to face the urban areas as an assembler of agents interacting within a network, while challenging the social and physical prejudices;
- The need to face water services as a matter of social matter in the water governance spectrum demands a transdisciplinary approach, where the urban water cycle lays within the integrated and collaborative framework of water services and resources, including also the territorial planning.
- The inclusion of new actors is accepted as an alternative towards a more democratic city, and assuring the resilience and adaptation capacity facing the global changes and sequent challenges (demographic, climate, economic).
- The 'right to water' in the city and its translation into innovative policies, and practices, is here advocated as the adequate approach to the current complexity, bringing more diversity and a mix of diverse knowledge inputs to the water problems, therefore contributing to more sustainable solutions.

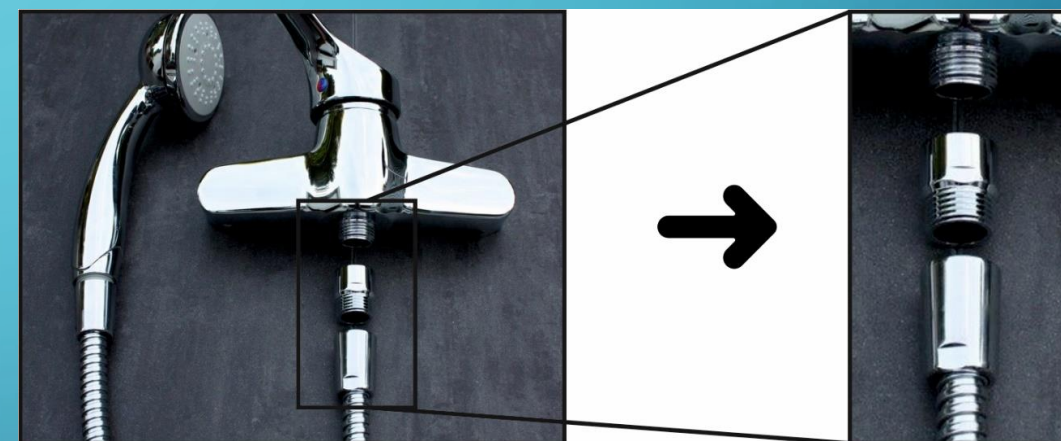
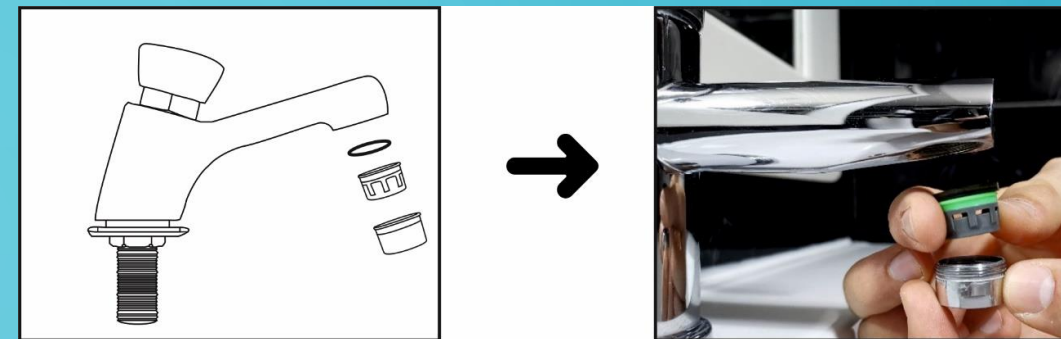


Comunidades Experimentais

Organização	Características locais
Centro Paroquial Padre Abílio Mendes - Barreiro	Número de utentes: 50 no centro de dia; 100 em apoio domiciliário; Número de funcionários: 55; Visita ao local: 04 de janeiro de 2019.
Escola Básica e Jardim de Infância Lumiar (Alto da Faia)	Número de alunos: 371; Faixa etária: 3 aos 10 anos; Número de professores/funcionários: 21 professores e 10 funcionários; Visita ao local: 04 de fevereiro de 2019.
Escola Secundária de Santo André - Barreiro	Número de alunos: 880; Faixa etária: ensino diurno entre os 15 e os 19 anos e noturno + 18 anos; Número de professores/funcionários: 180 professores e 60 funcionários; Visita ao local: 04 de janeiro de 2019.
Centro Comunitário de Telheiras	Número de utentes: 62 no Centro de Dia e 17 nas Residências Assistidas; Número de funcionários: 9 no Centro de Dia e 8 nas Residências; Residências 24h todos os dias; Visita ao local: 14 de fevereiro de 2019.

Organização	Características locais
LNEC - Departamento de Hidráulica	Número de funcionários: 67; Visita ao local: 14 de fevereiro de 2019.
Escola Básica 2, 3 de Telheiras	Número de Alunos: 600 alunos; Faixa etária: 10 aos 16 anos; Número de professores/funcionários: 77; Visita ao local: 15 de fevereiro de 2019.
Centro de Interpretação de Monsanto	Número de funcionários: 22; Visita ao local: 26 de março de 2019.
Centro Porta Amiga Olaias	Número de funcionários: 15; Visita ao local: 16 de julho de 2019.

Instalação dos Redutores de Caudal





Redutores
instalados nos
equipamentos
das CEs

Redução
média teórica

Experimental Community	Number of Equipments	Average Reduction (%)
Padre Abílio Mendes Center - Barreiro	Flushings: 0 Showers: 2 Taps: 10	-- 47 40
Elementary School and Kindergarten Lumiar (Alto da Faia)	Flushings: 0 Showers: 0 Taps: 24	-- -- 42
Secondary School of Santo André - Barreiro	Flushings: 0 Showers: 0 Taps: 33	-- -- 43
Community Center of Telheiras	Flushings: 14 Showers: 0 Taps: 8	29 -- 53
National Laboratory of Civil Engineering – Hydraulics Department	Flushings: 0 Showers: 0 Taps: 9	-- -- 36
Elementary School 2, 3 de Telheiras	Flushings: 0 Showers: 0 Taps: 23	-- -- 50
Global Average	Flushings Showers Taps	29 47 44 ± 9

Pegada Hídrica: 255 ± 126 L

(por pessoa e por dia, antes da instalação)

Percentagem de Redução Média de Caudal:

Comunidades Experimentais	Nº de Dispositivos Instalados	Redução de Caudal Média (%)
Média total	Autoclismos	29
	Chuveiros	44
	Torneiras	45 ± 9



IMPACT OF ECH2O ÁGUA ON THE EXPERIMENTAL COMMUNITIES

- **Consumer responsibility accounts for one of the subtopics of the sustainability concept with the most repercussions in public. It is a good starters point to make people reflect on the problem as the can easily relate it to their personal experiences. The project ECH2O takes advantage of this strategy and approaches people in their usual environment. The informative part of the activities consists in a presentation with occasional exchanges with the public through direct questions concerning their knowledge about the water cycle, their personal daily water use and strategies to save water in the domestic sphere.**
- **The results for a more critical and informed choice of different technological options inherent in consumption patterns can be achieved through the direct involvement of citizens in the changes in the patterns of consumption at a local level through experimentation.**
- **By promoting social innovation along with technological innovation, ECH2O-Água aims to influence towards more durable and sustained patterns of production for goods, within a circular economy perspective.**

FEEDBACK AND CONCLUSIVE NOTE

Short qualitative interviews with participants and coordinators of different institutions, indicate that the ECH2O-ÁGUA can have a stronger impact on their emotional and actual involvement in a sustainable use of water if the presentation of the scientific facts are more specifically adapted to different target groups and their life situation (literacy, housing, social life).

WATER FOOTPRINT

The Water Footprint (WF) represents the consumption and freshwater pollution caused by anthropic activities such as the domestic use of water by a person, the operational use of water in industries or enterprises, and the use of domestic water resources within a country.

The WF is an indicator of freshwater used, that includes both the direct and indirect use of a consumer or product, also defined as direct WF and indirect WF, respectively. It can be calculated for a specific product, process, person or region. In ECH2O-ÁGUA we considered the direct WF as a tool to measure the daily volume of direct water consumption per person, quantified according Venckute et al. (2017).

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Pegada Hídrica

"Pegada hídrica é um conceito utilizado pela UNESCO (Hoekstra, 2002) e diz respeito à quantidade de água potável necessária para se produzir um bem consumível."

A seguir poderá responder a dois questionários: O 1.º sobre o consumo direto de água no dia a dia e o 2.º sobre a água que se consome indiretamente.

A Universidade do Algarve - Instituto Superior de Engenharia apoia a Equipa de Projeto na avaliação e estimativas de consumos das Comunidades Experimentais ao longo do decurso deste projeto. Os dados recolhidos serão aplicados posteriormente na metodologia desenvolvida pela UALG, no âmbito da Parceria com este projeto.



Consumo Direto: a água potável que se consome no dia a dia

Questionário ([Link](#))

O resultado deste questionário será enviado para o mail que indicar.

O cálculo da pegada hídrica aqui feito é uma estimativa feita com base em respostas e percepções diversas dos inquiridos e não tem um objetivo de medição rigorosa. Destina-se a chamar a atenção para os consumos diretos e indiretos que todos fazemos diariamente no sentido de uma maior consciencialização dos usos da água.



Água virtual: a água que se consome indiretamente

Questionário ([Link](#))

O resultado deste questionário será enviado para o mail que indicar.

O cálculo da pegada hídrica aqui feito é uma estimativa feita com base em respostas e percepções diversas dos inquiridos e não tem um objetivo de medição rigorosa. Destina-se a chamar a atenção para os consumos diretos e indiretos que todos fazemos diariamente no sentido de uma maior consciencialização dos usos da água.

- **During this experimental phase, 180 participants completed the WF calculation survey and the WF of this sample of participants was 255 ± 126 L (average \pm standard deviation).**
- **This preliminary result confirms the need to change the current behavior by implementing concrete measures for the sustainable use of water.**

ECH2O FUTURE PERSPECTIVES

The project's team is developing an electronic application for the calculation of the WF, to improve its dissemination, mainly with young people. The interactive website ECH2O-ÁGUA will be used as a basis for future awareness campaigns in other geographic areas under climate change, promoting the sustainable water consumption and eco-efficient urban areas. ECH2O-ÁGUA can be extrapolated for Portuguese speaking countries, emphasizing water saving and drought control, in addition to the use of simplified disinfection systems for safe drinking water.

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Muito obrigada pela vossa atenção!

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