Water Technology Innovation Roadmaps (iWATERMAP), a Blueprint for place-based Innovation Ecosystems

REGION OF CRETE
ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ

European Committee of the Regions
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United Nations

The United Nations Commission on Economic, Social and Cultural Rights states that access to safe water intended for human consumption is a human right; water is also a commodity. The right to access water is necessary to lead a healthy life with dignity. It is also important for guaranteeing other human rights.

Right to water and sanitation is legally binding, affirms key UN body

1 October 2010

The main United Nations body dealing with human rights has affirmed that the right to water and sanitation is contained in existing human rights treaties, and that States have the primary responsibility to ensure the full realisation of this and all other basic human rights.

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Water quality and sufficiency are key issues for the Region of Crete due to many reasons such as:

- the variation of annual rainfall levels affected by climate change,
- overexploitation of groundwater, due to irrigation and the well-established tourism industry,
- high levels of water losses in the outdated water supply network, etc.

Crete Island has **1,559** Hotels with **85,407** rooms and **161,578** beds.

94 of these Hotels belong to **5***classification

and **238** of them to **4***

Nights spent in hotels and similar establishments in Heraklion reached **8.5 mn** in **2016**

Hotels in Crete	STARS					TOTAL
	1*	2*	3*	4*	5*	
CHANIA	54	293	120	55	22	544
HERAKLION	97	162	101	98	31	489
RETHYMNO	23	130	102	48	16	319
LASITHI	32	77	36	37	25	207
ΣΥΝΟΛΟ	206	662	359	238	94	1559

Table 1: Hotel capacity by Region in Crete, 2016

Water is used for showers, toilets, the kitchens, laundry, swimming pools, cooling, and irrigation. The average water consumption rates for hotels and resorts account for **84-2,000 liters per tourists per day, and as much as 3,423 liters per bedroom per day**

Innovation is mainly based on projects supported by academic and research institutes in Crete.

But the industrial sector also needs to support innovation in water technology. Most of the business sector consists of small and medium-sized enterprises which need to develop synergies with the research area and invest in innovation.

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Critical Mass Development

Development of synergies between the public/private sector and academic institutes, such as:

1. Management of irrigation networks: Monitoring of irrigation water supply. Region of Crete, Local Land Improvement Organizations (non-profit legal entities under private law responsible for the management of irrigation water), Foundation for Research and Technology - Hellas (FORTH), Institute of Informatics (ICS), Signal Processing Laboratory (SPL)

The project "Integrated decision-making system for irrigation crops at the level of Crete using innovative technologies – DE. F.I.C.I.T.»

In full operation innovative irrigation system of crops in Crete.

For the first time, online information of producers about the needs of the cultivation in water

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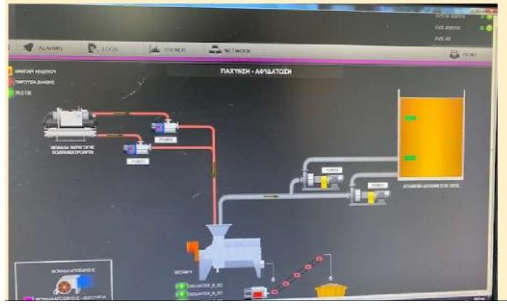
Critical Mass Development

2. Short Workshop for executives of Municipal Water Supply and Sewerage Companies, Chamber of Commerce and Industry of Heraklion, Municipal Water Supply and Sewerage Companies, Region of Crete - Vocational Training Center of Rethymno

Seminar of the VTC Technical Schools Chamber (EBEI) for water-wastewater-waste treatment technicians

Πρακτική εξάσκηση στο Δήμο Μινώα (ΔΕΥΑ-Αρκλοχωρίου)



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Human Capital

Lifelong learning actions such as:

1. Adults and the Lifelong Learning Programme "Water: Safety, Quality and Hygiene"

Target groups:

(a) University graduates in relevant fields and

(b) Adults of professional specialties related to water resources management (water supply network technicians, maintainers, etc.)

Center for Training and Lifelong Learning (KEDIVIM) of the University of Crete (Medical School)

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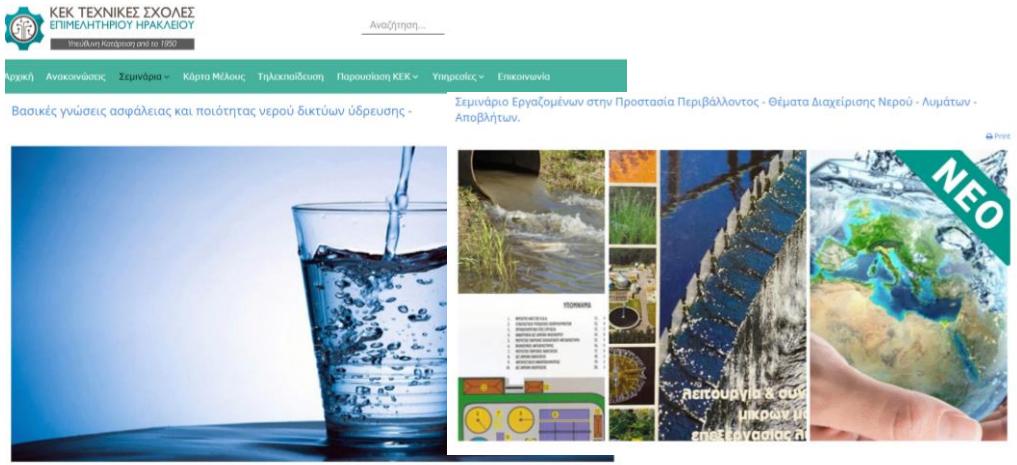

Human Capital

Lifelong learning actions such as:

2. Seminar "Environmental protection, water and wastewater management issues" Target group: Employees in water-wastewater management systems (in hotels, factories, facilities of bodies of the wider public sector (DEYA-OTA) but also all those who are interested in experience, specialization and certification in the management of water-wastewater systems.

3) Seminar "Basic knowledge of safety and water quality of water supply networks", addressed to employees, owners or managers of hotel units – rented apartments, hospitals, DEYA, etc.

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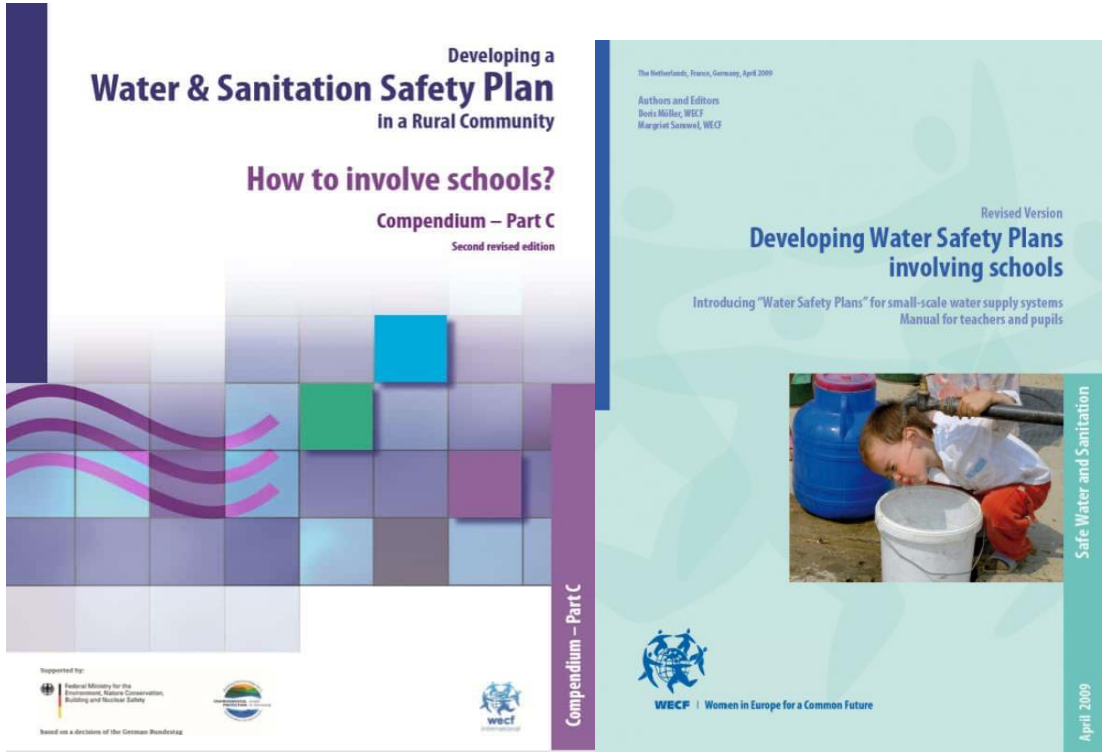
Human Capital

4. Educating students on water safety plans

Regional Directorate of Primary & Secondary Education of Crete/ Regional Centre for Educational Planning of Crete (PEKES)/ Region of Crete



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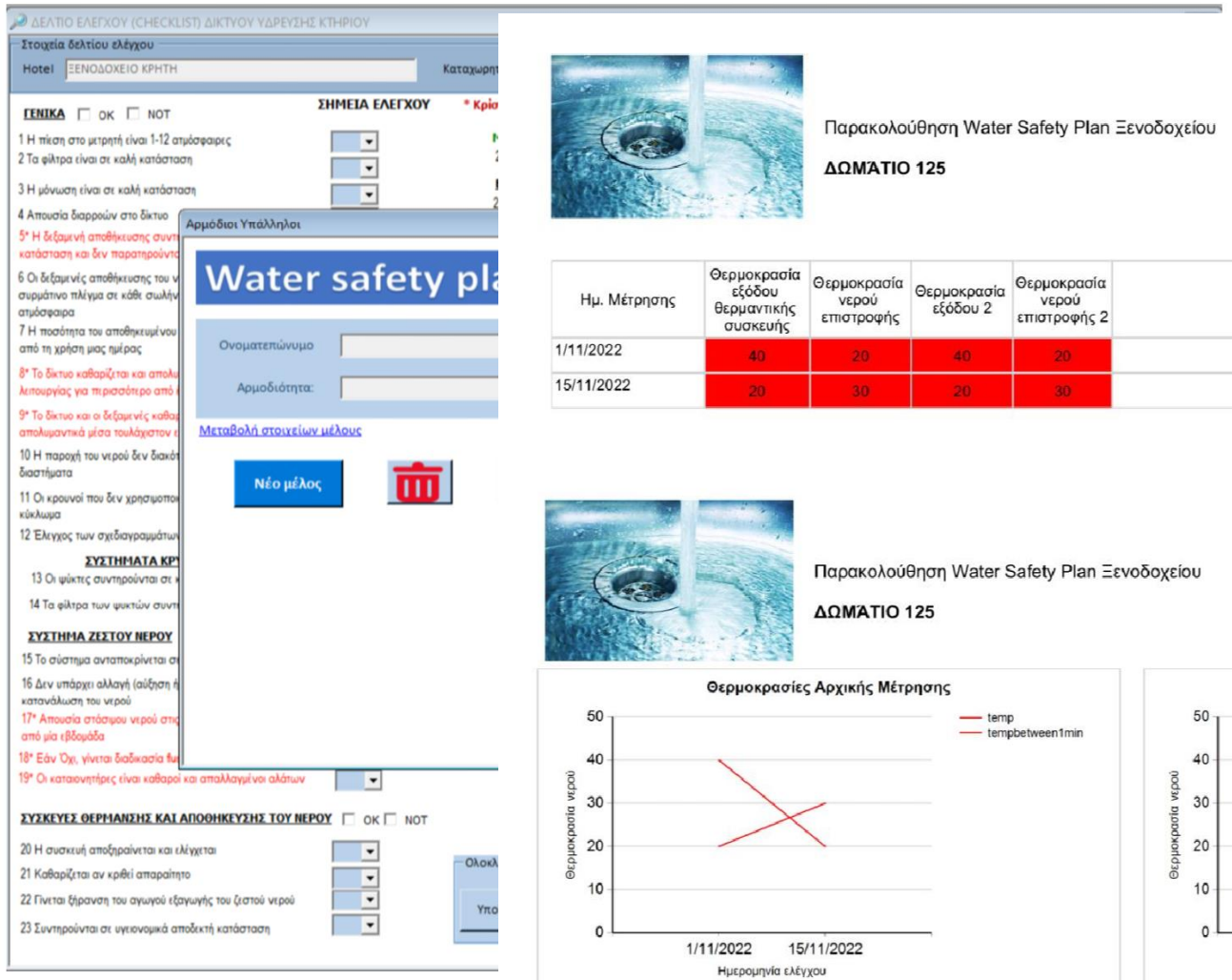


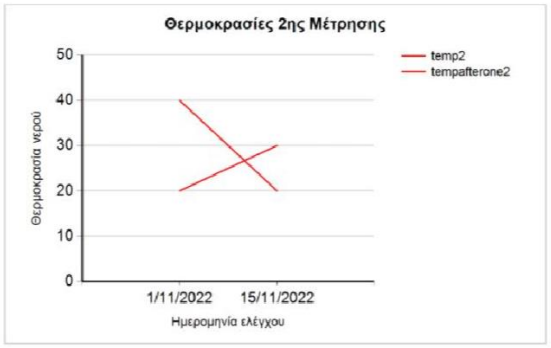
Παρακολούθηση Water Safety Plan Ξενοδοχείου

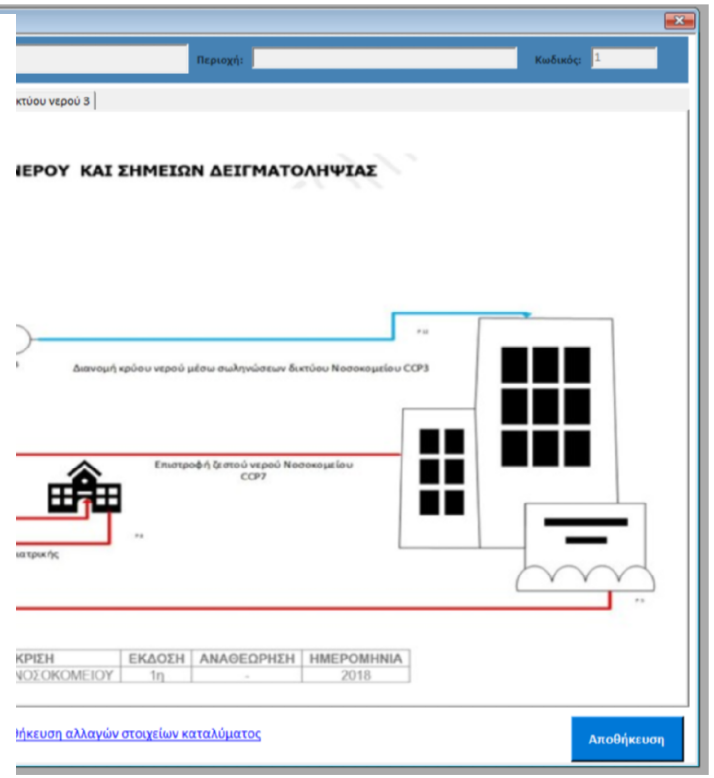
ΔΩΜΑΤΙΟ 125

Ημ. Μέτρησης	Θερμοκρασία εξόδου θερμαντικής συσκευής	Θερμοκρασία νερού επιστροφής	Θερμοκρασία εξόδου 2	Θερμοκρασία νερού επιστροφής 2	Διορθωτικές ενέργειες
1/11/2022	40	20	40	20	
15/11/2022	20	30	20	30	

Παρακολούθηση Water Safety Plan Ξενοδοχείου

ΔΩΜΑΤΙΟ 125





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Article

Legionella spp. Risk Assessment in Recreational and Garden Areas of Hotels

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Abstract: Several Travel-associated Legionnaires' disease (TALD) cases occur annually in Europe. Except from the most obvious sites (cooling towers and hot water systems), infections can also be associated with recreational, water feature, and garden areas of hotels. This argument is of great interest to better comprehend the colonization and to calculate the risk to human health of these sites. From July 2000–November 2017, the public health authorities of the Island of Crete (Greece) inspected 119 hotels associated with TALD, as reported through the European Legionnaires' Disease Surveillance Network. Five hundred and eighteen samples were collected from decorative fountain ponds, showers near pools and spas, swimming pools, spa pools, garden sprinklers, drip irrigation systems (reclaimed water) and soil. Of those, 67 (12.93%), originating from 43 (35.83%) hotels, tested positive for *Legionella* (*Legionella pneumophila* serogroups 1, 2, 3, 6, 7, 8, 13, 14, 15 and non-pneumophila species (*L. anisa*, *L. erythra*, *L. taurinensis*, *L. birminghamensis*, *L. rubrilucens*). A Relative Risk (R.R.) > 1 ($p < 0.0001$) was calculated for chlorine concentrations of less than 0.2 mg/L (R.R.: 54.78), star classification (<4) (R.R.: 4.75) and absence of Water Safety Plan implementation (R.R.: 3.96). High risk ($\geq 10^4$ CFU/L) was estimated for pool showers (16.42%), garden sprinklers (7.46%) and pool water (5.97%).

Keywords: *Legionella*; recreational water systems; risk; water safety plan; hotel

water

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Article

Legionella spp. Colonization in Water Systems of Hotels Linked with Travel-Associated Legionnaires' Disease

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Abstract: Hotel water systems colonized with *Legionella* spp. have been the source of travel-associated Legionnaires' disease, and cases, clusters and outbreaks continue to be reported worldwide each year. A total of 132 hotels linked with travel-associated Legionnaires' disease, as reported through the European Legionnaires' Disease Surveillance Network, were inspected and tested for *Legionella* spp. during 2000–2019 by the public health authorities of the island of Crete (Greece). A total of 3311 samples were collected: 1885 (56.93%) from cold water supply systems, 1387 (41.89%) from hot water supply systems, 37 (1.12%) were swab samples and two (0.06%) were soil. Of those, 685 (20.69%), were collected from 83 (62.89%) hotels, testing positive (≥50 CFU/L) for *Legionella pneumophila)* serogroups 1–10, 12–14 and non-pneumophila species (*L. anisa*, *L. erythra*, *L. tusconensis*, *L. taurinensis*, *L. birminghamensis*, *L. rubrilucens*, *L. londiniesis*, *L. oakridgensis*, *L. santicrusis*, *L. brunensis*, *L. maceacherii*). The most frequently isolated *L. pneumophila* serogroups were 1 (27.92%) and 3 (17.08%). Significantly higher isolation rates were obtained from hot water supply systems (25.96%) versus cold water systems (16.98%) and swab samples (13.51%). A Relative Risk (R.R.) > 1 ($p < 0.0001$) was calculated for hot water temperature <55 °C (R.R.: 4.43), chlorine concentrations <0.2 mg/L (R.R.: 2.69), star ratings <4 (R.R.: 1.73) and absence of Water Safety Plan implementation (R.R.: 1.57).

Keywords: *Legionella*; water systems; risk; water safety plan; hotel

A workshop in the framework of the European program "SIGMA Nexus – Sustainable Innovation and Governance in the Mediterranean region for the Network of Water, Ecosystem, Food and Energy Relations", was organized on Monday 29/6/2022, by the Organization for the Development of Crete, in Apokoronas, Chania.

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Among other things, it was stressed that "climate change and climate variability are projected to have a significant impact on agricultural production in the coming years, both in terms of crop yield and the locations where different crops can be grown. Areas such as Crete are among those that are expected to be most affected, with an overall negative impact on agriculture", a fact that, as it was pointed out, "must mobilize the competent bodies and take the best initiatives promptly".

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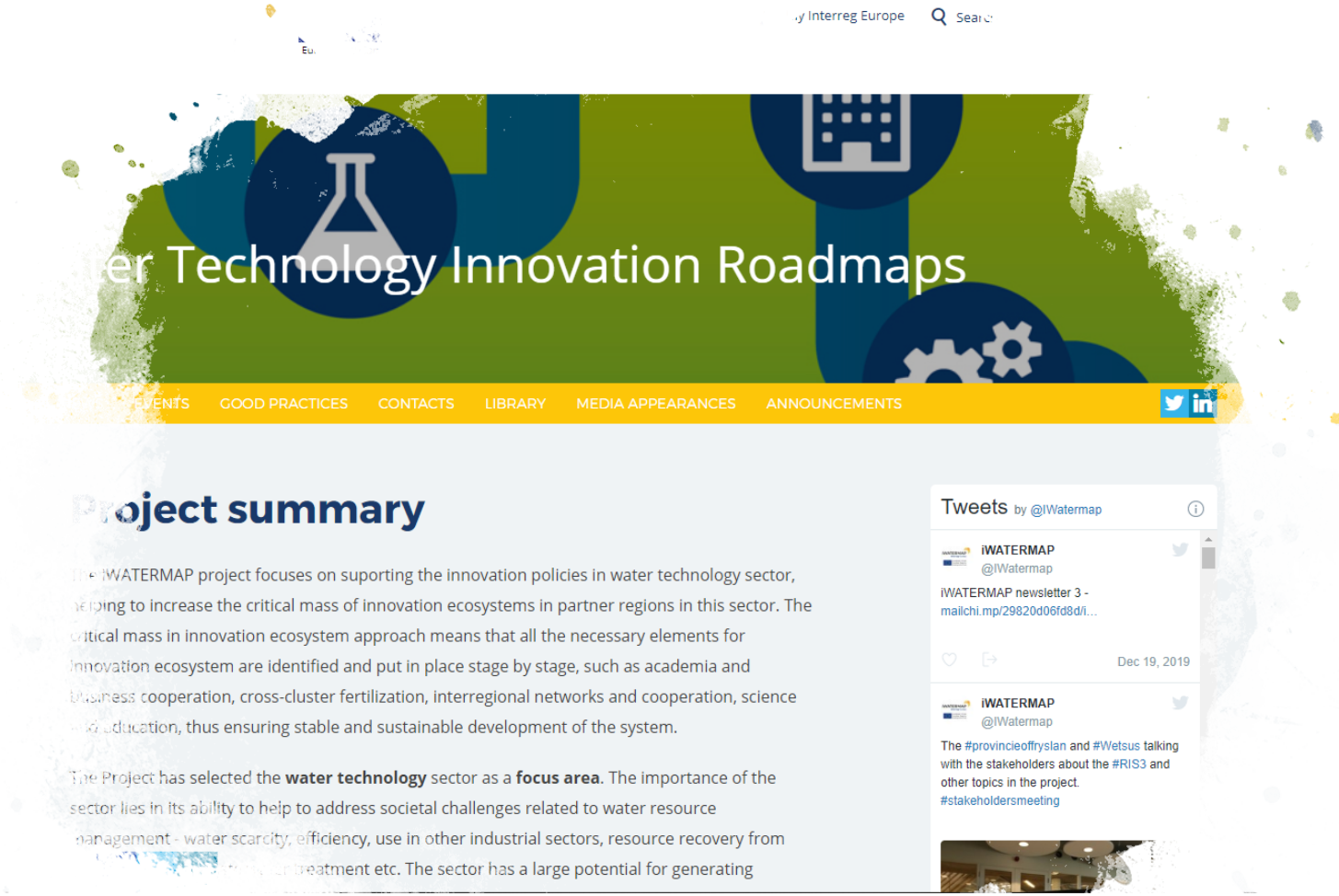

Thank you very much

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