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October 2019

Newsletter n. 6



*Dear Friends,
we would like to welcome you to
the 6TH Newsletter of the
CASTWATER project!*

SUMMARY

- STEERING COMMITTEE – MURCIA (25th September 2019)
- CASTWATER Mediterranean Conference 2019: Sustainable Tourism Water Management. Perspectives for Tourism Development in the Mediterranean Water Scarcity Areas
- CASTWATER Transferability Plan
- LOCAL NEWS

STEERING COMMITTEE – MURCIA (25th September 2019)



The last CASTWATER project meeting was held in Murcia last September the 25th.

The meeting presented the state of the art of the project, and all activities to be done to end the project.

**CASTWATER MEDITERRANEAN CONFERENCE 2019: SUSTAINABLE
TOURISM WATER MANAGEMENT. PERSPECTIVES FOR TOURISM
DEVELOPMENT IN THE MEDITERRANEAN WATER SCARCITY AREAS**



On 24 September 2019 CASTWATER Mediterranean final conference took place in Murcia (Spain) with the title: “Sustainable Tourism Water Management. Perspectives for Tourism Development in the Mediterranean Water Scarcity Areas”.

The meeting hosted relevant experts on sustainable tourism and water management from seven Mediterranean countries.

They all must face the challenge of supplying water in adequate quantity and quality for a growing tourist demand in the Mediterranean.

After the Welcoming words by authorities, the conference opened with a keynote speech on Water Demand Supply for Tourism in the Mediterranean Areas by Prof. María Hernández from the University of Alicante.

Representatives and stakeholders from Greece, France, Italy, Cyprus, Malta, Croatia and Spain continued the meeting in three different panels on Water footprint and other indicators for tourism, Water planning and strategies for sustainable tourism activities, Water security for tourism industry consumption in the Mediterranean areas.

About a hundred people attended CASTWATER final conference, and it was also the opportunity to know the results of the project and to promote possibilities of capitalization of the extensive package of

knowledge and practical solutions for Water efficiency tourism management.



CASTWATER TRANSFERABILITY PLANS

D5.2.1: Transferability Plans



RETHYMNO MUNICIPALITY

July 2019

In order to mobilise regional public authorities to integrate project main outputs, the CASTWATER partnership developed transferability plans for public authorities and tourism stakeholders of the partners areas to support integration of the project pilot activities' results into territorial policy initiatives and measures in the field of tourism and water management.

Produced by each partner, the transferability plan is a document providing details on how the lessons learnt from the project will be exploited in order to promote the CASTWATER monitoring tool and knowledge resources for public authorities to improve their capacity to support sustainable tourism water management improve the policy instrument tackled within that region. It specifies the nature of the actions to be implemented, their timeframe, the players involved, the costs (if any) and funding sources (if any). If the same policy instrument is addressed by several partners, only one action plan is required.

The proposed transferability plans integrate the produced by the project approach into relevant policies, strategies and operations. Each transferability plan develops specific actions to be included in the roadmaps of own territory for the promotion of the CASTWATER monitoring tool and knowledge resources for public authorities to improve their capacity to support sustainable tourism water management.

Each partner drafted a regional sustainability plan developing specific actions to be included in the roadmaps of own territory, and then circulate the plan/roadmaps to own contacts of stakeholders for endorsement.

For any information please contact your local CASTWATER partner.

This section is dedicated to the news which comes from all the project partners. Here below you can see the title of the local newsletter contents. If you want to know more, do not hesitate to contact us!

READ ALL LOCAL NEWS

MUNICIPALITY OF RETHYMNO

- [CASTWATER TECHNICAL MEETING](#)

VENETO REGION

- [WATER IN 6 WORDS: MISTERIOUS AND PRECIOUS.](#)

UNIVERSITY OF PATRAS

- [DECISION SUPPORT SYSTEM \(DSS\) FOR THE WASTEWATER AND BIOSOLID REUSE IN AGRICULTURE](#)
- [ESMART CITY EVENT](#)
- [MAIA WORKSHOP](#)
- [WORKSHOP FOR PUBLIC AUTHORITIES](#)

EUROMEDITERRANEAN WATER INSTITUTE FOUNDATION

- [THE IEA FOUNDATION JOINS THE EVENT "TERTULIA LA LUZ" FOCUSED ON WATER](#)

INSTITUTE OF AGRICULTURE AND TOURISM

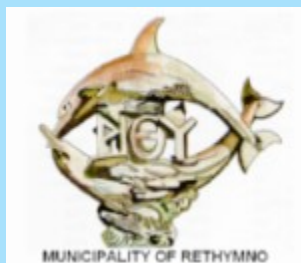
- [ABSTRACTS OF IPTPO STAKEHOLDER PRESENTATIONS AT CASTWATER FINAL CONFERENCE IN MURCIA](#)

VENETO INNOVAZIONE



From 11 to 10 October, the Water Festival was held in Venice. The event is organized by Utilitalia, the Federation of water, environmental and energy companies, and was the occasion for a discussion on the policies and on the issues related to water management in Italy.

The conference proceedings are present only in Italian on the website <http://festivalacqua.org/edizione-2019-gli-atti-del-festival-a-venezia/>



**MUNICIPALITY OF RETHYMNO
(LEAD PARTNER)**



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News from Rethymnon



CASTWATER TECHNICAL MEETING

The technical meeting of CASTWATER project was organized successfully with the attendance of Mr. Theodorakis Vasilis (Chairman of the Board of Directors of D.E.Y.A.R.), Mr. Papadakis George (General Director of D.E.Y.A.R.) Ms Sivaropoulou Loukia (Production & Management eng. Technical Department D.E.Y.A.R.) and employees of the Rethymnon Municipal Sewerage Company (D.E.Y.A.R.). Particularly, on Thursday 17th October 2019, Mr. Vasilis Myriokefalitakis from Rethymno Municipality (lead partner of the project), presented the

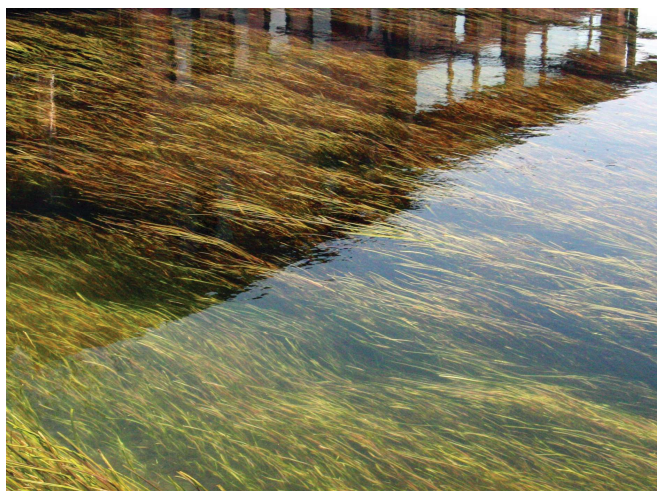
innovative online self-assessment water management tool that has been developed under CASTWATER project to D.E.Y.A.R. executives and employees.

During the meeting employees of D.E.Y.A.R. had the opportunity to use and evaluate the online self-assessment water management tool. Specifically, Mr. Myriokefalitakis presented the actions and initiatives developed in CASTWATER project and showcased the online self-assessment water management tool. After the presentation, there was an extensive discussion about the problems faced

by the competent water management bodies of the Municipality of Rethymno and plenty of valuable proposals were recorded for the adoption of new policies and motives for the increase of the effectiveness of water resources in touristic destinations both from Public Authorities and the private SMEs.

News from Veneto Region

WATER IN 6 WORDS



In this 6th issue, we finish with the 5th and 6th chapters of the publication made by International Center of Water Civilization Onlus: "Water in 6 words". The overall publication covers the water issue giving an overview and in-depth analysis as well, of different themes, with the aim to improve the water awareness and culture. We will publish one chapter per newsletter throughout all the next editions.

*Publication by International Center of Water Civilization Onlus
©"Laguna di Venezia" Basin Council
Edit by Eriberto Eulisse and Michele Cappellesso
Year 2017*

5. MYSTERIOUS

"Remember when discoursing on the flow of water to adduce first experience and then reason".

Leonardo Da Vinci

If we observe some ice floating on water, it will seem to us just a natural phenomenon, but have we ever stopped to think what would happen if ice would be heavier than water?

It would sink deep down seas and oceans, lakes and rivers, it would fill them gradually causing the end of many known life forms.

Even climate would suffer catastrophic consequences. In other words, life as we know it on planet Earth wouldn't be possible.

To tell the truth, from a strictly chemical point of view, the

behavior of water in this case is quite strange.

Actually, it's a real "anomaly": no known substance chemically behaves like this!

Normally when a liquid cools down (thus decreasing its energy and the movement of its constituent molecules) it reduces its volume until it turns solid, reaching then a density and a weight bigger than the same substance in liquid form and able to make it sink in the liquid itself.

In other words, if water would behave like any other substance, according to the normal theory of liquids, life on Earth would be a lot different compared from how we know it!

But more are the bizarre behaviors of water.

For example, it is able to win the gravitational force and climb up small diameter pipes called capillaries.

The capillarity forces play an important role, for example, in the ascension of water in plants.

Moreover, water is the sole known substance that, pressed by temperatures and environmental pressure, is present on Earth in all three physical states of matter: solid, liquid and gaseous.

Water is able to retain heat more than any other substance, thanks to its high thermal capacity or specific heat.

For this reason, it can convey heat in earth's movement and release it gradually, mitigating climate and making Earth hospitable for human presence.

Water also has a high surface tension, among the highest among known liquids: it is possible to see a metallic paperclip floating on water or an insect bouncing.

This explains the formation of water droplets, their dimension and the fact that they can lean against different types of surfaces without spreading themselves into a very thin veil.



This characteristic is, for example, very important for the cellular physiology.

Thanks to its extraordinary solvent capacities, water can solubilize a lot of solid, liquid and gaseous substances,

In this way you can wash things and wash yourself: it wouldn't have been possible otherwise to imagine the concept of hygiene.

Finally, we know that water turns solid at 0° centigrade (and at a pressure atmosphere) but reaches its higher density at 4° centigrade: it's because of this anomaly that ice floats. At 4° centigrade the so-called "anomaly point" is registered: water presents particular characteristics of fluidity that make an accurate observer like Schauberger think that, at this temperature, liquid presents "higher qualities".

In fact, it flows at full power, so fishes can rise to the surface by taking advantage of what the Austrian scientist calls "flow-contrary energy fields" [cfr. *Schauberger*].



Water's anomalous behaviors do not finish here. Others exist that would request deep knowledge of chemistry and for this reason they cannot be included in this study.¹³¹ In the light of the examples given above, it is clear that water is and remains a substance: absolutely *unique* for the diversities that it shows compared to any other known substance; *strange* for its anomalous behavior and *mysterious* because still elusive.

Felix Franks, an expert physics and chemistry researcher,

observed that "among all the known liquids, water is probably the most studied and less understood". A mystery that should make us think about the fact that this strange behavior is what makes life possible.

Such a uniqueness would require more attention than what we do today to safeguard the quality of all waters.

In other words, more civility is needed.

THE MEMORY OF WATER IN THE QUANTUM PHYSICS

If chemistry looks at matter, physics observes the phenomena and forces that interact in it.



Therefore, if instead of looking at water as chemists, we adopt the look of physician, we find out many other interesting phenomena that modern physics (quantum physics) is gradually revealing.

One in particular deserves to be mentioned.

¹ Melting point and Boiling Point unusually high compared to the molecular weight; fusion heat and vaporization heat extremely high;

extraordinary reaction capacities, direct and indirect; low viscosity; dielectric constant extremely high.



It was by chance that, after a wrong experiment, scientist Jacques Benveniste noticed an astonishing behavior in water. Observing the reaction of the molecules that make up the water, Benveniste came to the sensational conclusion that water has a “memory” able to receive, hold and give back information.

It was 1988 when his first article was published, rising incredulity, opposition and also a strong refuse by the scientist community.

Since then, anyway, other physicians have deepened and confirmed this theory refused at first by other scientists.

That same year two Italian physicians, Del Giudice e Preparata,^{14 2} compared the behavior of water to electric dipoles, that's to say antennae that transmit electromagnetic waves at specific frequencies, able to induce in other molecules synchronous and coordinated movements.

In other words, when the water molecules oscillate “in phase” and come together forming a unique group of molecules, they create (as they are a singular super-molecule) a coherent system, called “domain of coherence”. In 2011 a famous physics magazine, the *Journal of Physics*, published a study

made by a team of Italian-French researchers (among which the Nobel prize for medicine Luc Montagnier) called *Dna, waves and water*³ where some interesting experiments are made known.¹⁵ Scientists have put a segment of Dna in aqueous solutions and, after further dilutions, Dna started to transmit electromagnetic signals at low-frequency.

These frequencies were kept “in memory” by aqueous solutions.

The electromagnetic signal, in fact, made all molecules vibrate together at the same frequency (domains of coherence). The amplified signal was then recorded by a computer. Montagnier, Del Giudice and Vitiello have spoken of water “informed” by an electromagnetic signal, which is received, amplified and transmitted just as an antenna does.

In a laboratory on the other side of the world, to which the recording was sent, the reproduction of the same recorded signal was subjected to an aqueous solution, with the surprising result of being generated in the aqueous solution the same structure of the original DNA segment.

Water can be harnessed but not tamed.

It is universal element not stabilized, not determined,

It suggests the idea of freedom and it adapts humbly,

but it never allows to be caught.

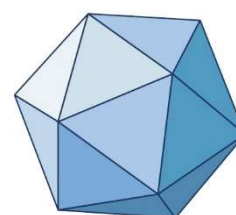
Retained water is stagnant water, dead water.

The invisible shape of water: the icosahedron

In *Timeo*, Plato associates to each basic element (fire, air, earth and water) the shape of a solid.

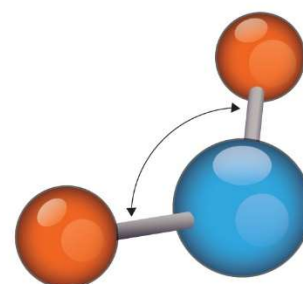
For the atoms of water, he had imagined the geometric shape of the icosahedron, whose surface is made by twenty triangular faces.

It took more than two thousand years to give A. Lavoisier (1783), who can be considered the first real chemist, the possibility to demonstrate that water is not a pure substance but a composed molecule.



Thanks to chemistry we know, in fact, that the molecule of water is composed by two atoms of hydrogen (H) and one of oxygen (O), that give the molecule (H₂O) an angle of 104,5°.

Nevertheless, the reality of water is definitely more complex, because it cannot be treated as a singular molecule.



The atom of oxygen, in fact, has two other pairs of electrons that function as two other vertices, giving water the characteristic shape of a tetrahedron.

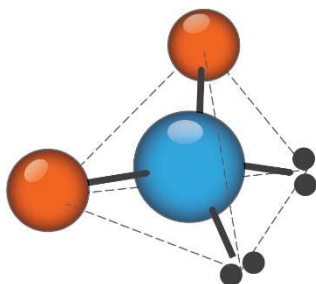
The atom of oxygen, negatively loaded and hydrogen, positively loaded, create a polar molecule with a big force of attraction in

² Emilio Del Giudice (1940-2014) Italian scientist of international renown, he has worked by the National Institute of Nuclear Physics in Milan;

Giuliano Preparata (1942-2000) Italian physician, he has taught at the most prestigious American universities.

³ Montagnier L., Aissa J., Del Giudice E., Lavallee C., Tedeschi A., Vitiello G., 2011.

comparison to the nearby molecules, generating a connection called “hydrogen bridge”. This particular connection can be considered without any doubt another anomaly of the water molecules, thanks to which it is possible to justify many strange behaviors of water.



A model in the structure of liquid water proposed in 1998 and confirmed in 2001 (x-ray viewed) assumes that a water molecule joins other nearby molecules to combine a *cluster* composed by 5 water molecules (a single molecule forms 4 hydrogen bridges then joins other four molecules); four molecules form a tetramer from whom will derive octamers. The combination process goes on until it reaches the geometric shape of the icosahedron characterized by 280 molecules (and a diameter of 30 angstrom)!¹²⁴

The weirdnesses of solid water

When water turns solid, it assumes an unmistakable configuration with hexagonal symmetry.

In 1931 William Bentley published in a book called *Snow Crystals* 6.000 microphotographs about snow diversity.

No other known substance crystallizes in so many different ways!

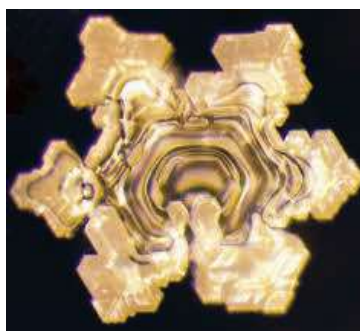
Equally extraordinary is the fact that ice, subjected to different values of pressure, gives rise to at least twelve different crystalline structures.

And there’s no scientific explanation of why the flat star ice-crystal remains confined within 2 dimensions instead of three!

Japanese researcher Masaru Emoto, after meeting bio-chemist Lee H. Lorenzen, has developed a particular technique for microscope observing and photographing crystals forming during water’s freeze.



In this way he has photographed the water of rivers, aqueducts and sewers of the big cities all around the world. Surprisingly he noticed that crystals deriving from the solidification of water were very different among them according to the conditions of the water itself, therefore considering its pollution level and typology. The images of the polluted water crystals showed, in fact, a definitely ugly aspect or, as Masaru Emoto said, less harmonious compared to the perfect geometrical structures of the unspoiled water crystals (picked up, for example, in mountain torrents or glaciers) that look like candid snowflakes with perfect hexagonal shapes.



Therefore, even Emoto’s research supports the thesis according to which water keeps the memory of the substances with which it came into contact and is not indifferent to the places it passes through and the treatments it undergoes.

Schauberger, a clever observer of water

Viktor Schauberger (1885-1958) was also called “the magician of water” because, more than a scientist, he was a clever observer of the precious liquid element.

He carried out several researches for Austrian prince Adolf von Schaumburg-Lippe, reaching inspiring conclusions.

He observed, in fact, that water generates shapes and forces; that it flows more intensively during cold days and, even better, overnight with the full moon.

Moreover, he assumed that during the day water is “lazy”.

He noticed that watercourses prefer curvilinear trajectories and the shade of vegetation.

Thus he theorized the cycloid motions of water.

These studies gave him the possibility, during winter 1918, along a river situated in an absolutely inaccessible region, to bring down to valley in one night more than 1.600 m³ of wood. A challenge considered impossible until then by the Prince’s engineers (Consigli, 2005).

Schauberger believed that it is not possible to understand water just following the logical thought, but it is necessary to develop a “biological” thought. With his refined observations about spiral and cycloid water motions, the scientist assumed theories able to provide interesting answers to otherwise inexplicable phenomena, boosting new further scientific researches.

6. PRECIOUS

“Everyone who drinks this water will be thirsty again, but whoever drinks the water I give them will never thirst. Indeed, the water I

⁴ www1.lsbu.ac.uk/water/icosahedra.htm

give them will become in them a spring of water welling up to eternal life". John 4, 10-14

SACREDNESS IN ANCIENT CULTURES

Today water is considered precious because it starts to run out. Because of this limit, we are becoming aware of its value. In reality, the perceived value of water has much older roots and is not just about its tangible appearance. We have seen that water is mysterious, it preserves a *quid* that escapes many logical explanations. In this last section we want to introduce the absolute preciousness of the liquid element under a meaning that is little known today, but not less important for this.



In all religions of the world, water has always been considered **sacred**. Ablutions, dives or baths have been, and

in part still are, complex and shared rituals, where water becomes a *medium* for contact with the divine. For Judaism, since ancient times, ritual immersion was a symbol of regeneration, purity and a way to rediscover the deep bond with original perfection. Christian baptism, too, originally foresaw the total immersion of the believer: it symbolized death and rebirth in a new life, with the cancellation of the original impurities. In the Islamic religion water is a gift of God and ablutions invariably precede the entrance to mosques. Hindus bathe in the sacred waters of the River Ganges, a river considered alive because it is itself a deity.



Long before, since **pre-history**, we have received widespread testimonies of the deep ties between water and the sacred. Engravings, votive offerings and artifacts of various kinds tell how the benefits of water were the gifts of divinities or, again, the water itself was the seat of divinities. Water was therefore considered sacred, magical and curative. The places of water near the healing springs, where in the Bronze and Iron Ages the peoples of Europe built

temples, for example the Etruscans or the ancient Venetians, later became the sanctuaries of the Christian religion.

Mythologies, tales and legends confirm this profound connection in every corner of the planet. In **Asia** we find Hindu God Narayana, "the one who resides on the water". From his navel was born Brahma, the creator of the Hindu Trinity. Sacred meanings of water can be found in many fundamental texts; from Babylonian poem *Enuma Elish* to Chinese *I Ching*. Some Buddhist monks still practise a particular activity aimed at spiritual perfection, which goes through physical confrontation with the water element. The exercise is focused on the ability to run on thin sheets of wood floating on water without sinking (*Shuishangpiao*).

In **Africa**, where water mainly symbolizes fertility, lived ancient peoples which used to adore a water deity called *Amon*. The Egyptians, whose country was "a gift of the Nile" (another river considered sacred), used to adore *Api*. According to the *Dogon* of Mali, in the sub-Saharan Africa, water is the seed of God that fertilizes the earth. Still with reference to the sacred perception of water, we can mention the *Guanci* (Canaries), the *Tuareg* (itinerant inhabitants of the desert) or the *Cabili*, ancient Berber population of the present Algeria.

In the great civilizations of the **Americas** (Maya, Inca and Aztecs), the sacredness and power of water were imbued with the same ambivalence it carries: life and death. Water, therefore, as a fertilizing force, but also as a destructive force. North American Indians, like

those in the Amazon forests, have instead developed cultures in perfect harmony with nature, marked by a respectful sacredness of the liquid element.

H₂O is today perceived as mere material and nothing more. The sensitivity of men, thanks to which it was possible to grasp a further dimension, seems to have become atrophied. As Mircea Eliade suggests, water "is alive, restless, it inspires, heals, prophesies" (Eliade, 2008) and in relation with this "power" of water, several religions and rituals have arisen by springs, rivers and marshes. Events that date back to the mists of time and concern all the cultures of the planet, no one excluded. Sacredness is a value that water has always held as a cosmogonic principle, enriched by numerous local epiphanies. To think that ancient men knew less about water than we did is limiting. It would be more correct to say that they knew it differently and it is for this reason that we must return to observe water, its flow and its unpredictable movement to understand the living, as suggested with acumen by Schwenk (1962).

For centuries, in every corner of the world, water has been perceived as a "divine gift" and expression of a deity, if not itself divine. Only contemporary culture and civilization have been able to desecrate water, that's to say to prevent any possible reflection of water towards a dimension transcending pure materiality. The consequences of such a desecration have been many and such as to make water available for every form of exploitation and poisoning,

promoting the destruction of countless ecosystems and of the forms of life present in them.

The only remnant left today of the archetypal imaginary referring to water is found in the advertising of bottled water, with the well-known references to purity, beauty and health, but also to weight-loss or even rejuvenation. They are lexical transliterations of the marketing. In them, however, we can also see a response to a feeling of man towards the water element still alive. At the same time we observe the trivialization of water, its reduction to just a thing among things, to a mere consumer good and finally, solely to commodity, as the only remaining purpose is to generate profit (Franzin, 2005; Eulisse, 2012).

This monodimensional vision of water – typical of the civility of consumption – risks to permanently delete the richness of expressions and meanings that has always distinguished the liquid element, depriving future generation of an important heritage of identity of our history and culture.



Italic populations and the sacredness of water

Countless are the testimonies received from **Sardinia** of "sacred wells" and "well-temples" that date back at least three thousand years ago and tell of the sacredness of the liquid element, with particular reference to underground sources. These are complexes created following ingenious astronomical calculations (linked to the phases of the moon or other stars) and ancient cults of fertility.

On the cult of water fertility and the recognition of the healing properties of many springs, the **Etruscans** produced a thick *pantheon* of deities, later absorbed by the **Roman civilization**. The latter has built and disseminated throughout Europe some distinctive features of its culture right by the water. In Rome, water was sacrally respected and was at the centre of public life. We cannot forget the monumental aqueducts and the beneficial public baths, as well as the oracular springs and thaumaturgical springs (water to rejuvenate or confer fertility), which manifested the creative and "transformative" potential of water, once conceived as a "passage between two worlds" (Teti, 2003).

In **Sicily**, the myths and rites of water inherited from ancient Greece are numerous. In addition to the functions of water already mentioned, we must enumerate the practices of initiation into the mysteries, always preceded by a catharsis that envisaged the ritual purification of body and soul. The oracle invariably expressed himself near a spring. Finally, we find the personification of springs and rivers. From these an articulated mythology has been generated which often,

and not by chance, puts into relation the political, cultural and religious unity of the city-states of Magna Graecia with the ancient continental Greece. Think, for example, of the myth of Alphaeus and Aretusa, whose sweet water still gushes today in front of Syracuse, or that of Ciane, the nymph sunk in the sacred swamps of the city-state (Franzin, 2005).

On this variegated cultural substratum, here only briefly sketched, **Christianity** has settled, bringing new meanings to the many manifestations of the sacred linked to water. In this way the oldest rites were replaced by a new religion. Finally, it should be remembered that many mythological and legendary figures of the ancient world were attributed, in the Christian era, a negative character (nymphs or *paides* turned into *anguane*), while the places previously used as pagan water cults were associated with a new patron saint.

Water as purification

Since ancient times, in every religion, water has had fundamental characteristics of sacredness, also by virtue of its purifying functions. The rite of purification has always indicated a sort of 'washing', from Christianity to Islam, from Buddhism to Shintoism, with the particularity of reaching not only the body but the depths of the spirit. Body ablutions have meant a cleansing of the soul everywhere. All rites, even the one closest to us, baptism (formerly practiced with total immersion of the body), maintain this principle: he who immerses himself in the water dies symbolically to be able to be reborn to new life, cleansed of the deepest spots.

For the historian of religions Mircea Eliade the oldest rites of humanity have involved almost everywhere the use of water. In fact, "*contact with water always implies regeneration. The immersion in water symbolizes the regression in the preformal, a complete regeneration, a new birth, because the immersion is equivalent to a dissolution of the forms, to an integration in the undifferentiated way of the pre-existence. And the exit from water repeats the cosmogonic gesture of the formal manifestation*" (Eliade, 2008).

Ancient liquid deities of the alpine world: the "anguane"

Water has been perceived for centuries as a purifying and therapeutic element, healing and restorative.

Nevertheless, it has also embedded an ambivalent nature: life and death, creation and destruction, as elements that exist side by side.

It is precisely from this ambivalent nature that mythical and legendary expressions were generated in the popular imagination in ancient times. For example, the popular epiphanies of the Alpine world refer widely to the figure of the *anguana*: a feminine and supernatural being, of which there are references in the popular traditions of the whole of Europe.



The uncertain etymology of the name Anguana could

refer to *anguis*, that's to say (water) snake or to latin *aqua*, from which *Aquanae*, river nymphs. The tradition often describes the anguane as young women with very long hair, particularly attractive and able to seduce or even kidnap men; in other occasions, they appear as creatures half women and half fishes or reptiles. Otherwise they are represented as thin, creepy old women, who appear on full moon nights and whose face is impossible to see. Almost always dressed in long clothes or, in some cases, in worn rags, they launch loud cries capable of stunning the unfortunate: in Veneto region the saying "*sigàr (shouting) come n'anguana*" has remained.

A characteristic feature of the "anguane" was their appearance near or in the depths of rivers, streams, springs, lakes and ponds, of which they were the guardians: a sort of *genius loci*. They had the power to predict the future or utter prophecies, cast curses, or cast spells, but they could also cure with their magical powers. With the Council of Trento, Christianity tried to eradicate this pagan cult deeply rooted in the popular world. This encouraged the overlap with the cult of the Virgin Mary. Churches and sanctuaries were built on the sacred sites previously dedicated to pre-Christian deities. For example, in Crespano del Grappa (Treviso), there is the Sanctuary of the Madonna del Covolo, not far from the Grotta delle anguane (Cave of the Anguane), which rises near a source that is a destination for pilgrimages because of the therapeutic properties of its water. In the Montello area the less known

cave of *buòro* or *cyane* has similar origins, and so does the site of Lagole, near Calalzo (Belluno), which denotes ancient origins that refer to cults related to water.

“Therefore, let the law concerning water be as follows: if anyone knowingly spoils another person's water supply, be it spring-water or reservoir-water, by means of poisons, drainage ditches or theft, the injured party shall bring an action before the urban commissioners, specifying in writing the value of the damage caused. Anyone found guilty of causing damage by means of poisons shall, in addition to the penalty imposed, purify the springs or the cistern where the water is stored, in whatever way, on any particular occasion and in any particular instance”.

Plato

News from the University of Patras



Decision Support System (DSS) for the wastewater and biosolid reuse in agriculture

Professor Dr. Ioannis K. Kalavrouziotis

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The **Decision Support System (DSS)** for the wastewater and biosolid reuse in agriculture has been recently developed by

the research Group of Laboratory of Sustainable Waste Technology Management (Prodromos Koukoulakis, Spyros Kyritsis and Ioannis Kalavrouziotis) of the School of Science and Technology at the Hellenic Open University (HOU), Patras, Hellas.

The aim of the DSS is to contribute to the effective exploitation of the huge quantities of wastewater and sludge or its treated form biosolids, produced

worldwide. The specific aims of the DSS are summarized below as follows:

- To reuse the wastewater for the irrigation of crops and biosolids minimizing human and environmental risk
- To enrich the soil with organic matter
- To improve soil structure, water holding capacity, and increase its resistance to erosion
- To supply the soil with plant nutrients
- To improve soil fertility
- To optimize the fertilization of crops

- To reduce fertilizer cost
- To prevent soil pollution with heavy metals
- To optimize crop production quantitatively and qualitatively
- To protect the agroecosystem from overload with heavy metals and plant nutrients
- To relieve the environmental stress from the pressure exerted by the huge quantities of wastewater and biosolids produced annually
- To optimize life quality

The DSS is a clever system capable of accomplishing controlled reuse of wastewater and biosolids in agriculture. Its capacity is based on the following possibilities:

- It can calculate the **optimum nutrient dose** for each crop, on the basis of:
 - the nutrient inputs including: soil residual nutrients, wastewater, biosolids, and organic matter, and
 - the nutrient losses due to leaching, denitrification, fixation and

removal via crop harvesting. By co-evaluating all the above sources i.e., **the nutrient inputs and the nutrient losses**, the optimum dose of each nutrient that is to be applied to the crop, is determined with accuracy. And as long as the total available nutrient is higher than the requirements of the crop for maximum yield, the nutrient dose will zero, not needing supplementary inorganic fertilizer for the crop. Otherwise, the software may indicate the need for supplementary inorganic fertilizer application, the quantity depending on the extent of the difference

- It can calculate the value of the **soil pollution index (Elemental Pollution Index or EPI)** and can give quantitative

information about the level of soil pollution with heavy metals

- It can determine the quality of the wastewater being used, and it may exclude from reuse if its concentrations in heavy metals are higher than the international standards (FAO)
- It can also calculate the optimum rate of liming material needed to improve a strongly acid soil to the desired pH level, for the normal growth of crops.
- It also informs the user about the level of soil salinity, a very useful information related directly to the plant growth. The treated wastewater can easily increase the soil salinity. and its timely forecasting is necessary.

The DSS is also friendly to the environment and can effectively contribute to the control of the wastewater and biosolids reuse in the agroecosystem, and it can function either with only wastewater or only biosolids or with both of them.

The current version, utilizing modern web

technologies, provides a simple, light and easy to use web interface even for a novice PC user. Its core engine is modular and flexible enough to accept and incorporate future changes new technologies or upgrades, so that its function can be continuous towards realization of the aims for which it has been developed.

Access to the system is provided as a hosted service. For those prospective users who are interested in acquiring an idea as to how the DSS functions and what it can accomplish, they can try a working demo of the current version (v 1.5), at the following URL: <http://wdss.eap.gr>

ESMART CITY event



On September 26, 2019, University of

Patras (UPatras) attended the ESMART CITY event at the Chamber of Achaia in the city of Patras, an event organized with the ambition to broaden the vision for a smart region and invite the sharing interesting experiences and practices from active projects and innovative approaches implemented in SMEs focused on smart and focused applications. The 'ESMARTCITY' project (also an Interreg Med project) targets at innovation capabilities of cities in the MED region by creating innovative ecosystems, involving quadruple operators (Citizens, Businesses, Universities and Public Authorities), and applying the ideas of Smart City technologies and technology to better services less consequences for it environment, in addition to producing new employment and living scenarios. The

involvement of everyone attending the event was very valuable in deepening cooperation, fostering innovation and enhancing the competitiveness of small and medium-sized enterprises.

MAIA workshop

On Monday, September 30, 2019, from 09:00 to 14:00 in the Achaia Chamber of Commerce (Patras), a workshop was held in the framework of Horizon 2020 "MAIA (Mapping and Assessment for Integrated Ecosystem Accounting) project - Mapping and Evaluation for Integrated Ecosystem Assessment)", where University of Patras (UPatras) partner attended. The seminar was organized with lecturers-trainers from the University of Patras and invited executives of the Services of Decentralized Administration, Western Greece and other Western producers. The purpose of the workshop was to inform about the objectives of the project

and to first consult with stakeholders on the development of methodologies for the management of natural resources, useful at local, regional, national and European level. The participants had the opportunity to exchange their approaches and methods towards sustainable tourism in the Mediterranean and worked together in thematic groups to better achieve this goal.

Workshop for Public Authorities



On October 9, 2019, in Patras, a one-day workshop was held for representatives of Public Authorities. The workshop was organized by the University of Patras

(UPatras) partner, in the Conference & Cultural Center inside University Campus of Patras.

The workshop was considered to be highly successful and multiple participants showed their interest (31 attendees in total). The majority of the attendees engaged in a fruitful conversation after the presentations, discussing water pricing tools for operators and water pricing tools addressing guests directly and stated that they were very interested in the water sustainability tools presented in the workshop.

The main recommendations from the speakers and the participants were:

- The need to improve water conservation and sustainability awareness
- The need for more laws, policies, mandates and regulations on sustainable water management
- The need for staff training (e.g. water service providers) so

- that they have the correct management information systems available
- The need for the further dissemination of the management tools presented in the workshop to raise awareness on water sustainability
- The need to reduce heavy bureaucratic burden in the policy making process

News from IEA Foundation



THE IEA FOUNDATION JOINS THE EVENT "TERTULIA LA LUZ" FOCUSED ON WATER

The director of the IEA Foundation Mr Francisco Cabezas, Mr Lucas Jiménez (SCRATS) and Sr Antonio Gil Olcina have intervened on July 11, in the forum on the water problem organized by "Tertulia La Luz" (a charity organization focused on the good image promotion of the Region of Murcia).

Mr Francisco Cabezas warned that if the Government would suppress the Tajo Transfer "it would have to face multimillion-dollar reparations".

Mr Lucas Jiménez expressed his displeasure because the minister meets with organizations that want the put an end to the aqueduct and not

<https://www.laverdad.es/murcia/tertulia-pone-foco-20190712003140-ntvo.html>.



receiving the irrigators, as published in the daily newspaper 'La Verdad'. The government delegate, Francisco Jiménez, will transfer to the Ministry the request of the irrigators to hold a meeting.

F-IEA COLLABORATES WITH ENAE IN THE PRESENTATION OF THE INTERNATIONAL BUSINESS SCHOOL FOR THE WATER SECTOR

The Euro-Mediterranean Water Institute Foundation collaborates with ENAE Business School and the General Water Directorate of Murcia, by taking part of the presentation of the International Business School for the Water Sector. At the event several representatives, experts on water field, were involved coming from countries such as Portugal and France.

The presentation was held at the headquarters of the DGA, last 9th October, implying the arrangement of an initial formation program of training courses (attended and online) focused on desalination, water reuse, transfer, aquifer management, water governance and integrated management for agriculture.

The courses are designed by the IEA Foundation together with subject matter experts such as Mr David Martínez Vicente (CARM), Mr Andrés Molina and Mrs M^a Ángeles Bernal del Hombre Bueno (both from the University of Alicante), Mr José Luis

F-IEA JOINED THE CONFERENCE: INNOVATIVE PRACTICES IN COASTAL TOURISM CONFERENCE

The IEA Foundation has been invited to participate



García Aróstegui from the Spanish Mining and Geology Institute (IGME) and Francisco Pedrero Salcedo from General Direction of Nature

in the Third-Party Event of Interact Programme Med Lab Group: Innovative Practices in coastal Tourism, celebrated last 13 May 2019, in Palermo (Italy) as representative of CASTWATER Project.



Conservation (CEBAS-CESIC).

Once a year the Southern Europe and the Mediterranean programmes meet to discuss about those topics that are of their interest. This year the meeting was focused on the thematic priority of coastal tourism, dealt under the objectives of innovation and environment, being these the most common for the cooperation programmes

operating in Southern Europe and Mediterranean area.

The proposed meeting brought together the

CASTWATER, has promoted the outcomes and experience of CASTWATER and especially its On-line tool in order to cover one of



most innovative experiences in coastal tourism, tackling its main threats but also its opportunities as an attractive economic sector in the Mediterranean area. Focused on discussions with the main actors, audience and EU Commission, the aim of the meeting was to exchange and break silos on the different funding opportunities (Interreg, ENI and H2020, others) looking for a more effective and efficient results in sustainable coastal tourism.

At the meeting Antonio Martínez-Nieto, the local coordinator of the Project

the main topics *“Threats of sustainable tourism model, discussing seasonality & mass tourism, lack of resources and the effects of marine litter”*.

CASTWATER: «Project co-financed by the European Regional Development Fund»

News from IPTPO



ABSTRACTS OF IPTPO STAKEHOLDER PRESENTATIONS AT CASTWATER FINAL CONFERENCE IN MURCIA

Mr Zoran Ardalić,

Odvodnja Poreč d.o.o.: EU project Poreč - *Sewerage and Wastewater Treatment Plants*

EU project Poreč - Sewerage and Wastewater Treatment Plants project is one of the largest projects in the water management sector in this region, co-financed by European funds. This project creates the assumptions of long-term environmental protection in order to further

develop the tourism, economy and raise the quality of life of the local population, through innovative technical solutions in wastewater treatment that are able to monitor large fluctuations in the seasonal flow of wastewater. It is about implementing technological solutions that will allow the reuse of purified water and treated sludge. It will also eliminate the possibility of groundwater pollution as a result of infiltration of sewage from septic tanks.

Ms Milena Radošević,

Istria Region, Administrative Department for Tourism:

Promoting water savings and reducing environmental pollution through the EcoDomus Tourism Program

EcoDomus is a marketing programme carried out by the Istrian Region Administrative Department for Tourism with the aim of increasing both social and environmental awareness in tourism. The Eco Domus project is aimed at small tourist accommodation establishments and aims at encouraging private renters to diversify and raise the quality of accommodation through alignment with the principles of sustainable development and

sustainable tourism. One of the categories that private renters have to satisfy is water management, such as: *promoting water savings and reducing environmental pollution.*

Mr Jurica Marinović,

Laguna Novigrad d.d.;
Real time monitoring tool: Laguna Novigrad's experiences

Aquacontrol - water management system is real time monitoring that provides complete control and management of water consumption in our accommodation facilities. The system includes specialized application solution for collecting, monitoring and processing water consumption data, appropriate hardware solutions, and utilizing experts and hotel team knowledge and experience related to effective rationalization and optimization solutions for water consumption in Laguna Novigrad facilities.

Ms Bojana Hajduk

Černeha, Istrian water protection system; *IWS – ISTRIAN WATER PROTECTION SYSTEM -*

the public sewerage and water protection system in Istria County

Due to the specific soil configuration as well as the characteristics and the abundance of drinking water sources across the Istrian peninsula, the need for the integral water supply and drainage management has arisen. The resolution of wastewater drainage and sewage has been recognized as an issue by small settlements which lack both economic and human resources to build and manage the sewage system. The basic significance of the project is Protection of drinking water sources from pollution and Improving the quality of underground water, while additional significance of the project is protecting the environment, increasing the quality of life in rural areas and value of land in central Istria. In order to realized this, a construction of the collection system for the settlements is planned.

CASTWATER WORKSHOPS WERE HELD IN PULA AND OPATIJA

On October 4 and 25, 2019, workshops within the project "Coastal Areas Sustainable Tourism Water Management - CASTWATER" were held at the premises of the Croatian Chamber of Economy in Pula and Faculty of Tourism and Hospitality Management in Opatija, entitled "Sustainable Tourism Water Management - Strengthening the Role of Public Authorities.



The workshops were organized by the Institute of Agriculture and Tourism with the support of Croatian Chamber of Economy and Faculty of Tourism and Hospitality Management. The overall objective of the project is to support sustainable management of water resources in the Mediterranean coastal area, improving monitoring and assessing the sustainability of water resources in the tourism sector.

Project Manager at the Institute of Agriculture and Tourism, Ana Težak Damijanić, PhD welcomed the

practices into the day-to-day operations of all target groups covered by the project.

Luk, emphasized the importance of rational use of water resources, with particular emphasis on the online application for monitoring and evaluation of sustainable water resource management, one of the main results of the project. The application is useful for small and medium-sized enterprises (SMEs) that intend to reduce their own water consumption and consolidate their operations with sustainable business policy, but also for public authorities, as it enables the identification of problems and the estimation of total water consumption in the areas



participants and emphasized the importance of support from the CASTWATER project stakeholders for research and development of new, more modern technologies in water resource management in Croatia. She also emphasized that the project's previous research and knowledge transfer aim to create an expert basis for the preparation of concrete action plans by public authorities, but also from other project stakeholders. Further, she emphasized that the project results will support the policy of integration of sustainable water management resources in tourism, and the integration of good

Ana Težak Damijanić PhD presented the activities as well as the main results of



the project. Marija Pičuljan, MEcon. spoke about identified patterns of water consumption in tourism in the Mediterranean area, as well as water saving measures, which stand out as examples of good practice. M.Sc. Ninoslav

within their administrative scope. Acceptance of this application contributes to the efforts of regional and local self-governments to further strengthen the segment of encouraging sustainable management of water consumption

and water resources through the implementation of sustainable tourism in their area.



Josip Rubinić, PhD (Faculty of Civil Engineering, Rijeka) spoke about (rational) water management in tourism as a concept of overcoming water challenges given the effects of climate change. Renata Grbac, PhD presented the results of her research on the factors of water consumption in hotels in Opatija. Dragan Sokolović (Smart Cloud d.o.o.) spoke on digitizing field data in water supply and sewage for efficient water management (Dragan Sokolović, Smart Cloud d.o.o.). Zoran Ardalić (Odvodnja Poreč d.o.o.) spoke on implementation of the most modern technological solutions in wastewater treatment in

the context of achieving sustainable water resource management.

During the workshop and during the official program, Danko Cvitan, bacc.ing.agr, presented the main results of the project "Sustainable tourism strategies to conserve and valorise the Mediterranean coastal and maritime natural heritage - INHERIT". Since this workshop was

intended, among other things, for stakeholders who partly base their business/activities on sustainable development

and environmental protection (Brijuni National Park), or cooperate with them for the purpose of protecting the natural heritage in the context of tourism (Plitvice Lakes Tourist Board as a form of representative of public authorities in collaboration with Plitvice Lakes National Park), this was a great opportunity to present the project at an event organized by a "third party".

The workshop in Pula was attended by 41 participants, while the workshop in Opatija attended by 29



participants - representatives of local and regional self-government, tourist boards, tourist and utility companies, higher education institutions and others interested in sustainable water resources management in tourism.

One of the goals of the workshops was to present the results and tools created within the project to relevant stakeholders, in order to foster a sustainable concept of water resources management in tourism. The workshop was aimed at stimulating, i.e. raising multi-sectoral awareness of the possibilities of water conservation and valorization in tourism, through dialogue and exchange of information, and aimed at identifying the constraints of different economic sectors when considering the application of water efficient technologies.

WHICH CHANGES DOES THE NEW "WATER LAW PACKAGE" BRING?

On July 18, 2019, a new package of "water" laws came into force:

- Water Law
- Water Services Act

- Financing Water Management Amendments Act

1) Water Law

The new Water Law regulates the legal status of water, water resources and water structures, but also compliance with the relevant EU directives.

Considering that the new Water Services Act also regulates the activities of public water supply and public sewerage, which has been regulated by the Water Law so far, there is a need for harmonization of the said laws (in the specific case of the separation of provisions relating to public water supply and public sewage from the applicable Water Law).

The main objective of the Water Law is to improve the status of aquatic ecosystems, to promote the sustainable use of water, i.e. the long-term protection of available water resources, and to mitigate the effects of floods and droughts.

2) Water Services Act

The goal of the Water Services Act is to operate efficiently and economically with the creation of prerequisites for the integration of about 200 local small

water suppliers. The law prescribes the obligation to integrate existing public service providers into a single public service provider in a public service area - by merging the largest existing public service provider in a particular service area.

In this way, conditions are created for the equalization of the price of water, that is, the establishment of a uniform price of water in one service area. The goal is to prevent monopoly and high tariffs, but also undervalued tariffs. What is to be achieved through the merger of suppliers is the reduction of losses of water abstraction, greater withdrawal of funds from EU funds, a significant streamlining of the business of water service providers and the harmonization of water prices.

These reform measures will strengthen the investment capacity of water service providers.

3) Financing Water Management Amendment Act

The law regulates the purposes of fees for the regulation of waters belonging to local self-government units, the authority to make decisions on development fees, to regulate the use of the funds generated from this fee etc.

Concluding considerations

This "water law" package represents a step towards better services for Croatian citizens and an increase in the availability of quality water. The aim is to achieve cost-effectiveness and efficiency of the business of public water service providers, thus creating the assumptions for price uniformity, that is, establishing a single price for water in one service area.

Thus, instead of a fragmented system (approximately 190 suppliers) are established to establish a unique and public water service provider. Also, economic regulation of water prices aims to prevent monopoly and high tariffs, but also undervalued tariffs, that is,

tariffs that are below the cost recovery limit.

Furthermore, this law regulates provisions that retain the activity of water services in the public sector (anti-privatization concept) and enables greater consumer protection by prescribing mandatory public consultation on the decision on the price of water services.

For more informations:

<https://www.voda.hr/hr/novosti/novi-zakon-iz-podrucja-vodnog-gospodarstva>

<https://www.teb.hr/novosti/2019/novi-zakon-o-vodama-nar-nov-br-6619/>

<https://vlada.gov.hr/vijesti/u-sabor-upuceni-prijedlozi-zakona-o-vodnim-uslugama-vodama-te-financiranju-vodnog-gospodarstva/25581>

<https://www.tportal.hr/vijesti/clanak/sabor-u-srijedu-o-paketu-vodnih-zakona-20190611>

<https://www.teb.hr/novosti/2019/izmjene-i-dopune-zakona-o-financiranju-vodnog-gospodarstva-nar-nov-br-6619/>

NEW WATER MANAGEMENT SYSTEM IN ISTRIA COUNTY

On July 18, 2019, the Water Services Act, which aim to create conditions for establishing a single water price in one area, came into force. Accordingly, Istria County and the cities other than Umag, have proposed to the Government of the Republic of Croatia that the area of Istria be a unique water service area, because of the same quality of service and equal price. Currently, each drainage system has its own price, and with a unique system, it is possible to achieve the set goals that the Government envisages by law. This system does not discriminate between Istrian cities and municipalities, which speaks of solidarity.

The introduction of a unified system of water supply represents one of the biggest reforms in Istria and another step to the highest European standards. By integrating the Istrian water supply system, the citizens of Istria will finally have a unique price for water, and the new model of water management will contribute to greater rationalization, standardization and cost reduction.

Istria has been talking about integrating water management since 2005. Numerous studies have indicated the multiple benefits of creating a unique water supply system. In this context, Istria aims to consolidate, rationalize and reduce costs and make it easier to apply for projects to withdraw European funds, with equal quality of service and uniform prices.

In Istria County, there are three different water supply systems but also 11 drainage systems, and with this changes the aim is to achieve solidarity, reduce differences in prices, and losses in water supply.

The Istrian water supply system is at the top in the Republic of Croatia in terms of coverage of water supply reaching 90 percent or drainage that is at the level of 50 percent. The goal is to take a step further and create all the preconditions for a better quality water supply.

Istria County, 15 years ago, by strategic documents and spatial plans defined the unification of this type.

For more informations:

<https://www.parentium.com/?clanak=73571>

<https://www.labin.com/vijesti/tulio-demetlika->

[stvaranjem-jedinstvenog-vodopskrbnog-sustava-nasi-ce-gradani-imati-istu-cijenu-vode-76032](#)

AN EXPERT'S VIEW - WATER AND TOURISM IN CROATIA

Izidora Marković Vukadin, PhD on the alarming situation in Croatian tourism in terms of water: In some places there are 30 times more tourists than local residents, and they consume three times as much water!



***Izidora Marković
Vukadin, PhD (The
Institute for Tourism)***

What conclusions do water consumption figures lead to? "Summer" vs everyday problems.

In some destinations during the summer months, the ratio of locals to tourists is 1:30, but also more. This is not healthy for either the local community or the infrastructure.

In Dubrovnik, where, although there is a lot of private accommodation, the accommodation is mostly "hotel", which leads to a much higher consumption of water, since all of these hotels have swimming pools, irrigation, and a rather large number of rooms, and users. When we

consider all these elements, it turns out that in Dubrovnik one local resident consumes a liter of water and tourist 2.71 liters.

A particular problem is the water consumption of the islands. For example, in Hvar, one tourist

consumes 3.5 times as much water than a local resident.

The big problem of the islands of Brac, Hvar and Vis is the infrastructure related to water supply, which is also a limiting factor of tourism development. On the other hand, sewage, the sewer network, is almost inoperative. In the area of Hvar, only 12% of all apartments have sewage and the rest are septic tanks and direct discharges into the sea without prior treatment.

What does all this data say about the sustainability of our tourism, above all about the state of our infrastructure?

That we didn't prepare the infrastructure well. Tourism has been intensively occurring for a long time, since the period of Yugoslavia. Of course, while all this infrastructure was being built, no one could have predicted that this kind of tourism boom was going to happen, especially not in such a short span of time.

The question of what to do remains, especially bearing in mind that in some destinations as much as 50% of drinking water is lost in transport. This is why continuous research is important, which will not only provide data and guidance of the type "you need to build and modernize your sewer network", but that you can also make a positive impact with some "soft" measures, new forms of tourism and pressure dispersion.

How can we overcome infrastructure problems at all until we come to more systematic solutions?

Some of our hotels, such as the "Esplanade" (Zagreb), which is a five-star hotel, have stickers on minibars inviting tourists to consume tap water to avoid using plastic bottles because they want to reduce the amount of waste the hotel generates. This hotel deliberately reduces the revenue it would generate by selling 20 kuna water bottles.

This should be the goal of all of us as residents, but

also of hotels, camps, private accommodation, to try to make a positive impact on our guests to use water resources more rationally and, ultimately, to reduce the total amount of waste.

For more informations:

<http://urednik.slobodnadaImacija.hr/novosti/hrvatska/clanak/id/591133/strucnjakinja-bez-okolisanja-ocrnim-tockama-hrvatskog-turizma-u-nekim-mjestima-je-30-puta-vise-gostiju-nego-domacih-a-trose-i-trostruko-vise-vode-pucamo-po-savovima-a-ovo-je-najcrnji-scenarij-koji-nam-prijeti>