



12th WEEC
CONNECTING PEOPLE
CREATING TOMORROW

12th WEEC
CONNECTING PEOPLE
CREATING TOMORROW



المؤتمر العالمي الثاني عشر
للتربية البيئية
التواصل بين الشعوب - صناعة الغد

Environmental

Congress Organizer



Congress Organizer



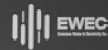
Destination Partner



Host Sponsor



Clean Energy Partner



National Strategic Partner



PROCEEDINGS OF 12TH WORLD ENVIRONMENTAL EDUCATION CONGRESS

29 JAN – 02 FEB 2024

ABU DHABI, UNITED ARAB EMIRATES

Under the Patronage of



Congress Organisers





World Environmental
Education Congress
Network

www.weecnetwork.org

© Istituto per l'Ambiente e l'Educazione Scholé Futuro - WEEC Network Ets
Via del Carmine 15 - 10122 Turin (Italy)



How to quote: EAD and WEEC Network (2024). Conference Proceedings, 12th World Environmental Education Congress. Istituto per l'Ambiente e l'Educazione Scholé Futuro - WEEC Network Ets - Torino (Italy), ISBN 9788885313675



01. THE CHALLENGES

02. THE GOALS

03. THE DIMENSIONS

04. THE MEANS

Table of Contents

Foreword iii

Opening Speech iv

Introduction..... vii

International and Local Socio-scientific Committee..... viii

International and Local Organising Committee and YEEC Committee xi

Thematic Clusters..... 1

CLUSTER 01: THE CHALLENGES 2

THE CHALLENGES THEME 01: TACKLING THE TRIPLE PLANETARY CRISIS - CLIMATE CHANGE POLLUTION AND BIODIVERSITY LOSS ... 3

086 Advanced Baseline Imager (ABI) Algorithm Processing System for Early Forest Fire Detection:
Theoretical Basis5

136 The Impacts of Climate Change and Global Warming Knowledge on
Youth Ecologically Sustainable Behaviour: A Cross-Country Evidence 13

474 Environmental Responsibility in Architectural Education: Tackling the Planetary Crisis
through UNSDGs 44

700 Green Competences: Empowering Future generation with Socioecological and
educational tools for Sustainable Jobs 53

901 The Most Serious Threat to the Economy and Environment Comes from Climate60

THE CHALLENGES THEME 02: WATER FOOD AND ENERGY NEXUS IN ENVIRONMENTAL EDUCATION.....69

261 The Contribution of Near-Infrared Waves, Bluetooth Connectivity, and
Android Operative System to Good Agricultural Practices in Southern Africa..... 71

426 Access to Clean Water and Proper Sanitation as a Fundamental Human Right in Africa..... 83

CLUSTER 02: THE GOALS 85

THE GOALS THEME 01: A WORLDWIDE COMMUNITY FOR SUSTAINABILITY AS THE GOAL86

164 Novice to Normal: Embedding Education for Sustainable Development in Learning and Teaching -
the Take 1 Programme as a Whole-School Approach88

194	Building a Decade of Ecosystem Restoration Education on a Solid Foundation: The Abu Dhabi Regional Centre of Expertise on Education for Sustainable Development (RCE)	94
490	Outdoor and Place-based Learning in the Decade of Ecosystem Restoration	99
550	Local Adaptation and Facilitation of Global Online Courses for Environmental Educators	100
654	Towards Meaningful Engagement of Youth in SDGs Processes.....	103
696	Mimicry of Scarcity: Reproducing Shortage as Educational Practice	110

THE GOALS THEME 02:**ENVIRONMENTAL EDUCATION FOR A SUSTAINABLE FUTURE..... 117**

016	SWOT Analysis of a Long-term Environmental Education Program	120
250	The Plastic Waste Crisis in the EU: Options for Action in Context of European Sustainability Policy - a Simulation Game for EU-related Learning and Teaching in Education for Sustainable Development	127
258	Programme de création d'un laboratoire junior d'écologie et de santé environnementale dans un lycée en France: Une approche pratique pour l'éducation à l'environnement	140
296	Inspired by Laudato Si': an Ecological Approach to Education and Training.....	146
327	Contribution à l'élaboration d'une stratégie nationale d'éducation environnementale en Guinée.....	150
338	FuturePitch@Smartfeld: Prototyping Tomorrow with Entrepreneurship and New Technologies	157
359	Principles of Education Practices for Sustainability in the Amami Islands - A Structural Analysis of the Amami "Environmental Culture" Education Programs of Higher Education Institutions.....	164
570	Determination of the Relationship between High School Students' Knowledge, Awareness and Attitude Levels towards Sustainable Development	171
588	Enhancing Climate Change Education for Primary School Children in Kenya.....	178
611	Effective Citizen Science: Playing a Role in Marine Life Restoration	181
717	El proyecto ALEC: un enfoque regional para la educación sobre el cambio climático	188
724	Air Quality at New York University Abu Dhabi: Measuring the Effects of Information Provision on Knowledge, Behavior and Policy Preferences.....	197
758	GREEN Olympiad: A Case Study to Augment Learning through Non-formal Education	223
345	Boost Project-drive Environmental Education for Sustainability in the Basque Country: Collective Intelligence for Networking.....	228
494	Programa De Formación Ambiental En Reducción De Riesgos De Desastres Para Estudiantes De Universidades De Cuba, Latinoamérica Y El Caribe.....	230



CLUSTER 03: THE DIMENSIONS.....240**THE DIMENSIONS THEME 01:****A MATTER OF VALUES AND CULTURAL DIVERSITY -
INDIGENOUS KNOWLEDGE AND CULTURE..... 241**

049	Land-based Learning as a Form of Resiliency During Pandemic	243
169	المعجم الحساني الجغرافي، أداة لحفظ الثقافة المجالية المبدعة لدى الإنسان الصحراوي	251
276	Repositioning Environmental Education Organizations' Approach to Environmental Disasters	262
447	Naming Our Forest: Cultural Preservation in Environmental Communication.....	267
670	Knowledge from below in the Venetian lagoon: Traditional Indigenous Knowledge on Water Environments as Innovative Sustainable Solution to the Challenges of Modernity	269

THE DIMENSIONS THEME 02:**AESTHETICS ETHICS AND EMOTIONAL DIMENSIONS -
THE ROLE OF ART AND DESIGN IN EE****275**

191	The Fresh Press Enterprise: A Sustainable Action Project for Paper Production at Zayed University Using Locally Sourced Agricultural Waste.....	277
-----	--	-----

CLUSTER 04: THE MEANS..... 283**THE MEANS THEME 01:****ARTIFICIAL INTELLIGENCE AND SMART TECHNOLOGIES****284**

106	Conceptualización De Un Sistema De Información Geográfica (Sig) Para La Educación Ambiental (Ea) En Bogotá, Colombia (2002-2021)	286
-----	---	-----

THE MEANS THEME 02:**EFFORTS AND CHALLENGES IN EE FOR EARLY CHILDHOOD EDUCATION****294**

089	Una Inmersión En La Memoria: El Nacimiento De La Escuela Levino Cândido.....	296
341	The Climate Change and Early Childhood Care and Development Nexus: A Case of Eswatini.....	301
392	La Realidad De Las Escuelas Y La Nueva Forma De Brindar Educación En Afogados En Ingazeira-Pe, Brasil	314
571	Development of a Tool towards Enhancing Early Childhood Education in Schools and at Homes Providing Basic Environmental Knowledge Using Artificial Intelligence Technology.....	320
645	منهج السنة النبوية في غرس وتنمية قيم التربية البيئية وأثره على الأطفال	326
726	Awareness and Sustainability. An action-research on Early Childhood Educators and Parents in the Municipality of Rome	334
629	ممارسات التربية البيئية في التراث العربي والإسلامي: "تحول حضاري نموذجي"	338



THE MEANS THEME 03:**OUTDOOR AND PLACE-BASED LEARNING IN THE DECADE OF ECOSYSTEM RESTORATION..... 345**

107	La caractérisation d'une ruelle verte comme patrimoine où déployer une éducation à l'inclusion.....	347
195	Estudio piloto de salidas de campo basadas en el juego con estudiantes del Grado en Educación Primaria.....	360
491	Nature Education for a Planetary Citizenship – the Erasmus+ 'ECoNNECT' Project: Training Nature Educators in Complex Systems Thinking.....	367
513	Sensibilisation du public en plein air Concept de chemins pédagogiques spécifiques au site.....	370
564	Building Community Partnerships for Eco restoration Projects in Greater Mumbai through CSR.....	378

THE MEANS THEME 04:**PROMOTING COLLABORATION AND LEARNING COMMUNITIES TO ADDRESS****SOCIO-ENVIRONMENTAL CHALLENGES 389**

393	Desarrollo de una propuesta participativa para la restauración ecológica urbana de un espacio público en Costa Rica	391
621	Green Schoolyards as Learning Landscapes and Green Livingrooms of Neighbourhoods	398
648	Nature-Based Education Networks: Collaborative Transformation of the Territory in Colombia: A Comprehensive Examination of the Implementation of Nature-Based Education and Regenerative Leadership in Colombian Schools.....	407
715	Urban Cohousing in Search of (Socio-Eco)-Sustainability: Italian Cases	413
902	Innovation Communities: A Tool for Innovation and Sustainable Development in the New Post-Columbian Normality.....	423



696 Mimicry of Scarcity: Reproducing Shortage as Educational Practice

Elena Bougleux⁽¹⁾

Abstract

Water molecules are the main actors of a Summer School dedicated to Heritage and Environment realized on board of a boat in navigation, by a community of international and multidisciplinary students and teachers. During the last few years (2022-2024) the narrow spaces of a small wooden gulet have been acting as a floating classroom, meeting point and hostel for all School participants, while the limited spaces, power supply and fresh water available were shared among all. Sharing the scarce resources has represented the core educational texture of the Summer School on board.

0. Premise

It is a difficult educational challenge that of finding a catchy key concept+keyword in Environmental Anthropology able to trigger the interest of students and keep it high and engaged in a productive way. I am referring to the continuative kind of interest that lasts longer than the few hours of an academic course, and survives beyond a seasonal volunteering campaign. Sometimes it is difficult to maintain the interest and engagement active for even less than a campaign; it is also quite a challenge, on the other hand, to convey feelings of environmental worry and sense of responsibility in relation to the multiple disasters we are provoking on the planet as a specie, and sensibilize about the risks we are running, without transferring to the students also feelings of fear and anxiety, or even worse, helplessness and despair.

In the context of environmental education, when dealing with the well-known conceptual couple 'problem-solution' related to crises pervading all anthropized spaces as well as remote unspoiled hideouts, one simple convincing conceptual element is missing, which would keep the learners' interest high: a credible strategy-out. The loss of grip, of interest and the vanishing long term engagement

performed by students, and by citizens in general, can be read within an easy conceptual framework: disengagement as self-defense against fear, anxiety and helplessness.

After many years of educational activities as intensive labs, cooperative projects and applied-kind of papers, as a teacher I decided to bet on the committing keyword of 'scarcity': an unusual concept to promote in the educational discourse, and an uneasy concept to handle in the super-prevailing rhetoric of the global north, which strives to defy all kinds of scarcities at whatever level and definition, in all contexts of life and research. Scarcity is unpleasant as we all as intriguing, familiar as well as unknown.

The idea of scarcity servers in these pages as conceptual strategy-out and as polysemantic tool: a) rhetoric device, b) material construct, c) provocative descriptor (of objectively not-scarce scenarios). Before articulating in details about the three semantic levels of scarcity, let's introduce the space-time location where our mimicry of scarcity unfolded.

1. The context

The location of this analysis is the eastern cost of the Adriatic Sea, from the Italian northern end characterized by historical Venetian legacy to the southern end of Albania. Running or rather, sailing along the thousand kilometers of the Adriatic Balkan cost is like making an estranging travel in time: only thirty-five years ago this coastline was entirely following Yugoslavian territory: nowadays sailing the same sea route entails the crossing of four national borders: Slovenia, Croatia, Bosnia and Herzegovina, Croatia again, Montenegro. Among the many historical and political upheavals, the crucial element I want to stress here is the discontinuity in the status of environmental protection affecting this sea, and the variety of meanings attributed to the (anyway

(1) University of Bergamo



vaguely defined) spots known as Marine Protected Areas, MPAs.

Italy and Slovenia, recently joined in UE by Croatia, necessarily interpret the MPA definition in the framework of UE legislation, despite each country applies such legislation with different limitations and enforce it with different level of control (Carreno and Lloret 2020). Bosnia doesn't really develop any marine regulatory law, while Albania and Montenegro have national local regulations. But sea waters and fish don't respect any border nor acknowledge any marine regulations. The juridical fragmentation in the watery material continuum produces a demoralizing picture of double scarcity for Adriatic sea Marine Protected Areas: scarcity of coherence, scarcity of relevance.

The Mediterranean Sea is crisscrossed every year by 350 million leisure boats (better would be to say every summer); as a pale balancing measure it also hosts 1215 MPAs, almost all of which are small or very small, and scattered along the northern side, i.e. along the European coasts (for a detailed account of the historic evolution of MPAs in the Mediterranean, see MedPAN 2023). Croatia, the main action theatre for the present paper, has dedicated over the 9% of its national territory to natural parks, both terrestrial and marine, and this farsighted choice played a relevant part in the successful process of joining the UE; but being Croatia so small, the overall extension of the Croatian MPAs is anyway minimal.

In most MPAs across the Adriatic Sea, from the UE protected to the self-managed ones, some form of unregulated fishing is still allowed, and quite often leisure navigation isn't restricted nor regulated either. Leisure navigation is worth a special mention here since paradoxically it is the most environmental impacting anthropic activity: non-professional sailors are the least experienced and the most unaware of the damage they provoke by simple everyday actions like anchoring, lighting up underwater lights at night, producing unnecessary noises. Considering their numerosity and the difficulty in enforcing small scale control, leisure boats are a major and increasing threat to marine environment. Definitely the Mediterranean Sea MPAs, and in particular the Adriatic ones including those located in one single country, suffer an overall scarcity of surface, and as a consequence a scarcity of effectivity.

Unfortunately, both scarcities mentioned

in this paragraph belong to what the 'worst' level of our polysemantic tool introduced before, the b) *material constructs*: as they are tangible, they have a legal status, they produce material effects on the sea.

2. The Core Concept

The environmental education experience we have set up in the Croatia seas and based on the concept-keyword of scarcity consists in a Summer School entirely in navigation, conducted for three years, from 2022 to 2024 (wishing to continue every year) along the coasts of former Yugoslavia: always navigating and never docking if not occasionally at night, never disembarking if not for fieldwork, especially and above all never using the facilities of marinas.

The choice of the eastern Balkan coast as our Summer School location is highly symbolical and entangled with one clear definition of scarcity: the fragmented political picture offered today by the small countries that once constituted Yugoslavia is a metaphor of a newly achieved condition of scarcity: scarcity of political relevance, scarcity of effectivity in environmental action. The condition of 'small and young country' doesn't represent a limit per se, of course: the constraint on relevance is rather posed by the controversial political relations characterizing the region, causing a lack of integration in environmental planning and the lack of shared visions on the future. A persisting centrifugal force is still lingering among the once united national actors, and this is dramatically reflecting on the sea conservation policies. But despite all such on-land mix-up, the sea still connects the coastlines in the same way it did in historical times. Water keeps blending and mixing in a watery scenario what recent history has scattered in pieces. Sea waters produce a continuity that luckily resist to this particular production of scarcity.

Actually the production of scarcity from former Yugoslavia young countries expands beyond the sphere of sea regulations: archeological sites in each new nation are logically fewer in total numbers, and such condition of 'archeological scarcity' doesn't make any site more relevant nor protected: on the contrary, the lack of an integrated and autonomous archeological narration renders each site an exception, an isolated item, harder to treat and interpret. The



scarcity of historical coherent reconstructions of archeological sites isn't once more an issue *per se*, but scarcity of shared narrations make other elements belonging to the same context appear like scarcities: sites are isolated and hardly reachable, while imaginaries around them are poor or lacking, making them weakly protected, little appropriated by local communities and eventually tending to invisibility.

Similar is the case of historical heritage from the recent past of Tito's times and from the 20th century in general: when dealing with Yugoslavian memories it is hard to find shared interpretations, each of them rather reflecting from the polarized political perspectives that each young country has assumed with respect to their own common past. The interpretation of recent historical heritage suffers the strong constraints of today's opposite political positioning, and for the time being it is going to be unavoidably so. Therefore the issue of scarcity enters the interpretation of recent history via the first level of the polysemantic tool I have introduced: the level a) *rhetoric device*. Rhetoric rather than material device, because it emerges from failing narratives rather than being due to a materially scarce state of things. Such rhetoric-kind of scarcity could be easily overtaken by bringing into light all non-scarce elements well existing and available, but the prevailing rhetoric of political divergence makes such scarcity - the lack of a shared narration of the recent past - at the moment quite concrete and binding.

Turning an eye on former Yugoslavia industrial development, another striking element of potential scarcity appears: new industrial plants and industry dedicated areas have to be boosted almost everywhere, either starting from scratch in new born countries, or re-developing the partial remains of Yugoslavian larger infrastructures, so putting a strong pressure on land exploitation and soil consumption. In the case of Croatia, land means coasts, and implies the exploitation of the the sea. Scarcity of land, of (new) industrial plants, of interpretation tools and normative frameworks are the most visible scarcities of type a) and b) of our experiential context.

The experience of navigation is placed exactly at the center of the described entanglement, intending to highlight and at the same to mock the arbitrariness of

the scarcities just described, watching them from the sea. Every day on our boat it is necessary to face every day localized yet challenging scarcities, like that of fresh water, power supply, and personal space: sharing these vital assets, all scarcely available on board, has metaphorically and materially promoted the awareness of reciprocal need and mutual interdependence among all members of the crew, no matter if sailors, students, teachers. Indeed when talking of mimicry we intend it in a sort of manufactured feature: we *intentionally* made fresh water and power scarce, by deciding never to dock in marinas to fill the tanks (marinas being some of the most polluting and impacting coastal infrastructures). We faced an intentional scarcity as a consequence of a collective responsible decision. Never refilling the tanks implied that the quantity of water available was known since the beginning: collective decisions were taken about how to consume it, what to give up onto, what the water consuming priorities where. Such material scarcity produced by the navigating community could be dealt with thanks to a collective decision process.

The scarcity of power supply is also a consequence of the collective decision to switch off the boat engine at nights, while being off the power grid provided on land; from dusk to dawn our boat was just off. Indeed, darkness was partially compensated by the solar generated power, as we installed a solar panel and accumulator portable system, removable and separated from the boat engine supply. The boat didn't become self-sufficient *per se*, nor had fully renewable power sources, but we brought it and installed it, proving it feasible, easy and efficient. The management of the solar power system (4 AC plugs, 4 USB plugs) was fully in the hands of students, who had to focus on their individual energy needs, most of them for the first time ever. Both scarcities described in this paragraph enter in the b) category defined above, being *material* constructs: we *made* them being so, avoiding all behavioral shortcuts - like docking in a marina - that could have easily solved them. This was part of the essential bet: checking how long and how far this mimicry of scarcity could be pushed.

The scarcity of space on a 24 meters gulet where 24 people are living together for 24 hour a day doesn't need to be explained in detail, but it's worth pointing out that the numerosity of the crew on board was once more the outcome of a collective choice.



We could have been fewer participants, but we choose not to. Sharing cabins, outdoor space, tables for eating and working, sockets for the cell phones and centimeters along the clothesline, all these manufactured through real scarcities – all of them provided with a clear deadline, the end of the Summer School – made the navigating community strong and unite, behaving as a single body and a unique entity, marking and claiming its quality of 'being different'. Despite knowing well that on-board scarcities were mimicked, the metaphorical effect worked well, producing a high level of reciprocal interdependence and acting as magnifying lens to observe the other major, dramatic, awful scarcities around. Most relevant, the production of scarcity and its management kept the level of engagement high, during the School and after.

3. A Few Geologic-historic-Anthropological Details

Among all the intense days of in our itinerary in navigation, I choose to describe only one in



Img. 1: The itinerary in navigation around the Krk northern peninsula, from the harbor of Omisalj (blue dot at the center of the picture), to the LNG-ship, visibly docked in the center bottom of the picture (*Elaboration on G-Maps by the author*).

detail in this paper, as it represents at best the density of interpretative layers we experienced, the complex interdependencies between ancient and recent past, the all-scale environmental and political implications, and multiple scarcities (Img. 1).

The archeological site of Fulfinum Mirine sits on the western site of a narrow peninsula off the coast of the Croatian island of Krk. In an area less than one square km, it's easy to catch in a single

glance: the remains of Fulfinum, a roman village from the first century BC; the remains of a paleo-Christian basilica of Mirine, from the IV century BC (Img. 2); the remains of Dina Petrokemija, an industrial plant of the late XX century which produced polyethylene until it was closed down in 2011 (Hydrocarbon-Technology.com 2024¹) to become object of multiple post-bankruptcy market operations aimed at setting it in function again, with adverse fortunes (Ministry of Economy 2024²); the twenty shining white oil tanks owned by Janaf (the Croatian national oil company) towering the



Img. 2: The Mirine paleo-Christian basilica dating back to the IV Century (*Photo by the author*).



Img. 3: Five of the twenty oil tanks owned by Janaf, the Croatian national oil company (*Photo by the author*).

landscape with their majestic cylindrical bodies (Img. 3); finally, last and least, the brand new LNG floating re-gasifier plant, looking like a navigating tanker but actually a permanent infrastructure, named LNG-Hrvatska, docked at the new facility built on purpose for it in the last few years and facing the Roman ruins (Img. 4).

Such a complexity and amount of contradictions can easily escape the gaze of the not expert observer, because of the geographic features of

(1) Last access on June 2024

(2) Last access on May 2024

the peninsula, narrow and hilly therefore hiding most of its internal features, and because the largest part of the coastline is not accessible to the public, nor walking nor driving nor swimming, being private property of the oil company Janaf. A good glance over the scenario of Janaf tanks and the LNG floating plant can be taken from above, from



Img. 4: The construction of the docking facility for the LNG-Hrvatska, in 2019-2020. In the background, on the hills, the village of Omissalj (Photo by Balkan Insight).

the historical Venetian village of Omissalj located on the top of the hill surmounting the peninsula. Once reached the nice and cozy super-elevated village of Omissalj, the sight from the top towards the sea is beautiful and kind of disquieting but the village is 'safe', far from the coastline and far (enough) from the LNG re-gasifier plant noises.

The Venetian toponym of the place still remaining in modern Italian is Castelmuschio, a late derivative of the Latin *Castrum ad musculos*, Castle over the muscles, referring to the once abundant muscles growing on the sea at the bottom of the cliffs. No need to say that nowadays there is no muscles growing nor fishing activity thriving in Omissalj. By the way, no one uses the old Venetian-Italian toponym anymore.

Another nice way to grasp the full sight of the place is offered by the sea, thus requiring a boat and therefore performing a "water-scaping" activity, as it was planned for the whole Summer School activities. At first we docked our gulet in the small harbor of the peninsula on the opposite site of the archeological remains. From the small harbour, a short walk in the little pine forest brings us in sight of the Roman basilica, perfectly restored: as we get closer, the basilica emerges in front of us like a sunrise. When climbing downhill towards the archeological site along the easy walking track, also the yellow lights of the floating LNG plant rise in front of us. It's full day, yet the plants' lights are bright and striking.

The LNG ship is just out of scale in this landscape: we know that this re-gasifier can provide much more gas than Croatian consumers all together will ever need, so it is openly serving a different scope: it is as a large hub to supply politically reliable gas to eastern Europe (Gerebizza 2019): Omissalj happens to play a little part in the larger political framework designed to subtract eastern European countries like Bulgaria, Hungary and Serbia from the dependence of Russian gas supply (Prtoric 2020, Łoskot-Strachota 2023). Indeed the LNG-ship is owned by a Norwegian company, the LNG gas company is based in Luxembourg, the financing dedicated to development of the docking site arrived to Zagreb government directly from the EU. Croatia provides 'just' the location.

Such a large plant anchored in this delicate archeological scenario, next to the little village once sitting on a lot of muscles, has been imposed on the local community of Omissalj by the national Croatian government, after a harsh confrontation lasted over a decade between the local mayor and his administration on one side, ministers and investors on the other, as witnessed by countless newspaper and media accounts. While the hard talks were going on, a group of archeologists started to dig around the Roman and paleo-Christian ruins, finding more and more evidence of the enduring relevance, lasting up to the Middle Ages, of the ancient site of Mirine as a harbor, as natural ship shelter and as a commerce hub (Causevic-Bully 2024). Unfortunately such precious researches produce only a scarce echo outside the circles of specialists, and the silence around archeological research is not helping to strengthen the policies of protection at a national level. On the other hand, this is the ideal context to propose the setting up of an archeological park, both on land and in the sea, dedicated to ancient navigation, cross-cultural encounters and commerce in the Late Antiquity. The project exists, despite at the moment the project is just an idea on paper.

The images from drones and satellites suggest a scarcity of relevance, mainly due to a scarcity of size, of the archeological area compared to the industrial area: hydrocarbon plants visually overcome the ruins, no matter what. On the other hand, when considering also the buffer zones of both activities, a different perspective and a better balance appear and develop (cf. Img. 5 and Img. 6): the hypothetical ArcheoPark would be so large as to compete in size with the industrial area.





Img. 5, 6: Aerial view of the peninsula area, with highlights on the anthropic settlements and diverse activities, as the camping site and the plants.

The photo below shows the hypothetical areas dedicated to archeology and industry, obviously mutually excluding each other (Photo elaboration on G-Maps by the author).

Therefore in this case scarcities in size and in relevance are relative matters, depending on the adopted point of view: they are observer-dependent kinds of scarcity, entering the third type of the polysemantic tool: c) *provocative descriptors*.

4. Conclusion

Let's now analyze the three levels of meaning of the polysemantic tool of scarcity according to the definitions suggested at the beginning of the paper, applied to the specific case study of Omisalj. The level a) *scarcity as rhetoric device*, is clearly visible in the rhetoric construction generated by the political sphere, which narrates a condition of energy scarcity for the people of Croatia. Behind the claimed emerging need of gas from (to be necessarily produced by the LNG plant) for Croatians familyhood and not only, lay other needs and drivers, not explicated and much less open: another attempted green rhetoric describes the supply of gas from LNG as 'cleaner than oil', substituting the more polluting traditional refinery, but this is just impossible to propose given that LNG (liquid natural gas) is still a fossil fuel. Moreover the

'clean energy' topic fades when it is proposed in the very same area where oil tanks owned by the oil company Janaf store crude oil, waiting to be refined in the traditionally polluting way.

The level b) *material construction of scarcity*, is mainly unfolded through the manipulation of images. Pictures representing ruins and antiques are always framing them in small scales, very zoomed in, so never showing any context around the archeo-objects. Ruins seem to be standing alone in clear and empty space, a timeless no-place with nothing contrasting nor challenging them. On the contrary, the images of industrial plants are always large aerial views, wide and impressive large scales, well contextualized and fully understandable within their geographic location. Their relevance emerges evidently even at the eyes of the not expert: big is beautiful, big is technological, and technology is the future; plants mold the landscape, whatever was already there.

Our slow navigation around the peninsula approached the LNG ship and refinery where in theory is forbidden to sail, and allowed a comprehensive vision of the full scenario with the real proximities between objects, reciprocal interactions and clashes. The dimensional scarcity is interestingly fought by archaeologists, who are trying to expand the size of the archeological site not only in space but also in time, proving clues of the long(er) history of Fulfinum, long(er) duration of the settlement, a deep(er) past. As said before the future of the archeological area is still unwritten, and rhetorics play a big part in shaping such future.

As a final comment using the scarcity polysemantic level c) *provocative descriptor*, I wish to state that scarcities can be built, undone, mimicked, suffered, used and bluffed, as educational key concept and as a strategy-out. Water related issues and environmental commitments are proven to be able to overtake the rhetoric of artificial scarcities drawn by legislation, and the material scarcities in language, representations and money. Water intended as a common is never scarce, and it provides a decentered and unifying gaze over conflicts; water intended as overarching material and metaphorical concept – therefore at the same time scarce and not scarce – allows the articulation of a wide global perspective over environmental education that open up constructive discussions on the stewardship of the contemporary, that go well beyond the borders of environmental education.



5. References

- Bougleux, E., & Iguman, S. (2024). Aquatic teaching framework in the Anthropocene. *World Futures. The Journal of New Paradigm Research*, in press.
- Carreno, A. & Lloret J. (2021). Environmental impacts of increasing leisure boating activity in Mediterranean coastal waters. *Ocean and Coastal Management*, 209, 105693. DOI: <https://doi.org/10.1016/j.ocecoaman.2021.105693>.
- Causevic-Bully, M. (2024). Insular Population of the Kvarner in the V Century: Mirine-Fulfinum and Martiniscica Church Complexes Case Studies. *Antiquité Tardive* 31, 63-82. DOI: 10.1484/J.AT.5.136158
- Gerebizza, E. (2019). Chi ha davvero bisogno del terminale Lng di Krk in Croazia. *Recommon online*. <https://www.recommon.org/chi-ha-davvero-bisogno-del-terminale-Ing-di-krk-in-croazia/>
- Green, L. (2020). *Rock | Water | Life. Ecology and Humanities for a Decolonial South Africa*. Duke University Press.
- Hydrocarbons-Technology, (2024). *Adria LNG Project*. <https://www.hydrocarbons-technology.com/projects/adrialngproject/>
- Ivetic, E. (2020). *I Balcani. Civiltà confini, popoli (1453-1912)*. Il Mulino.
- Kaplan, R. D. (2022). *Adriatic. A Concert of Civilizations at the End of Modern Age*. Random House, New York.
- Łoskot-Strachota, A. (2023). The War in Ukraine: A Chance to Reduce the Western Balkans' Energy-Dependence on Russia. Europe and Russia on the Balkan Front. In. G. Fruscione (Ed.) *Geopolitics and Diplomacy in the EU's Backyard*. ISPI Ledi Publishing.
- Matvejević, P. (1999). *Mediterranean: A Cultural Landscape*. University of California Press.
- MedPAN and UNEP/MAP-SPA/RAC, 2023. *The 2020 Status of Marine Protected Areas in the Mediterranean*. By Neveu R., Ganot D., Ducarme F., El Asmi S, Kheriji A. and Gallon S. Eds. UNEP/MAP-SPA/RAC & MedPAN. Tunis
- Ministry of Economy, Republic of Croatia (2013). *Dina Petrokemija PLC*. <https://investcroatia.gov.hr/wp-content/uploads/2013/10/DINA-Petrokemija-Plc..pdf>
- Prtoric, J. (2020). Energy Independence': Critics Turn Up Heat on Croatian LNG Plan. *Balkan Insight*. <https://balkaninsight.com/2020/01/17/energy-independence-critics-turn-up-heat-on-croatian-Ing-plan/>
- Wiersma, Y. F. (2022). *Experimental Landscape Ecology*. Springer Nature.

