



COASTAL

Collaborative Land-Sea
Integration Platform

Deliverable D30 Practice Abstracts 1-36 Reporting Period I

AUTHORS

Jean-Luc de Kok (VITO), Bastiaan Notebaert (VITO), Georgia Destouni (SU), Samaneh Seifollahi-Aghmiuni (SU), Giorgos Maneas (SU), Erasmia Kastanidi (HCMR), Ioannis Panagopoulos (HCMR), Aris Karageorgis, (HCMR), Françoise Vernier (IRSTEA), Jean-Marie Lescot (IRSTEA), Luminita Lazar, Florin Timofte, Mariana Golumbeanu (INCDM), Ruxandra Pop (ICEADR), Alice Guittard, Ebum Akinsete, Phoebe Koundouri (ICRE8), Javier Martínez-López, Joris de Vente (CSIC), Zsuzsanna Selmeczy (GEO), Maxime Depoorter (GRBR)

APPROVED BY WP MANAGER:

Zsuzsanna Selmeczy (GEO)

DATE OF APPROVAL:

30 October, 2019

**APPROVED BY PROJECT
COORDINATOR:**

Jean-Luc de Kok (VITO)

DATE OF APPROVAL:

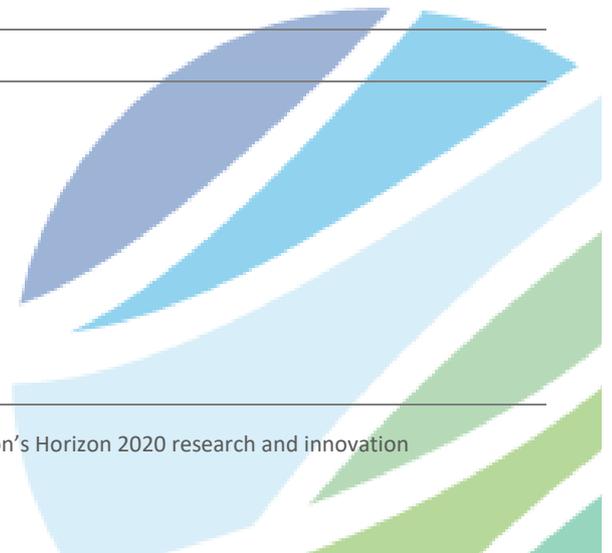
30 October, 2019

SUBMITTED:

30 October, 2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773782.



CALL H2020-RUR-2017-2 Multi-actor Research and Innovation action	RURAL RENAISSANCE - FOSTERING INNOVATION AND BUSINESS OPPORTUNITIES - New approaches towards policies and governance
WORK PROGRAMME Topic RUR-02-2017	Coastal-rural interactions: Enhancing synergies between land and sea-based activities
PROJECT WEB SITE: COASTAL Knowledge Exchange Platform:	www.h2020-coastal.eu www.coastal-xchange.eu



COASTAL: Collaborative Land and Sea Integration Platform - Co-creating evidence-based business roadmaps and policy solutions for enhancing coastal-rural collaboration and synergies in Europe focusing on economic growth, spatial planning and environmental protection. Project timeframe: 01/05/2018 - 30/04/2022

Partnership:



This document was produced under the terms and conditions of Grant Agreement No. 773782 for the European Commission. It does not necessary reflect the view of the European Union and in no way anticipates the Commission's future policy in this area.

TABLE OF CONTENTS

INTRODUCTION	3
1. PRACTICE ABSTRACTS REPORTING PERIOD I	4
1.1. PRACTICE ABSTRACT 1	4
1.2. PRACTICE ABSTRACT 2	5
1.3. PRACTICE ABSTRACT 3	6
1.4. PRACTICE ABSTRACT 4	7
1.5. PRACTICE ABSTRACT 5	8
1.6. PRACTICE ABSTRACT 6	9
1.7. PRACTICE ABSTRACT 7	10
1.8. PRACTICE ABSTRACT 8	12
1.9. PRACTICE ABSTRACT 9	13
1.10. PRACTICE ABSTRACT 10	14
1.11. PRACTICE ABSTRACT 11	15
1.12. PRACTICE ABSTRACT 12	16
1.13. PRACTICE ABSTRACT 13	18
1.14. PRACTICE ABSTRACT 14	19
1.15. PRACTICE ABSTRACT 15	21
1.16. PRACTICE ABSTRACT 16	22
1.17. PRACTICE ABSTRACT 17	24
1.18. PRACTICE ABSTRACT 18	26
1.19. PRACTICE ABSTRACT 19	27
1.20. PRACTICE ABSTRACT 20	28
1.21. PRACTICE ABSTRACT 21	29
1.22. PRACTICE ABSTRACT 22	31
1.23. PRACTICE ABSTRACT 23	32
1.24. PRACTICE ABSTRACT 24	33
1.25. PRACTICE ABSTRACT 25	34
1.26. PRACTICE ABSTRACT 26	35
1.27. PRACTICE ABSTRACT 27	36
1.28. PRACTICE ABSTRACT 28	37
1.29. PRACTICE ABSTRACT 29	38
1.30. PRACTICE ABSTRACT 30	39
1.31. PRACTICE ABSTRACT 31	40
1.32. PRACTICE ABSTRACT 32	41
1.33. PRACTICE ABSTRACT 33	42
1.34. PRACTICE ABSTRACT 34	43
1.35. PRACTICE ABSTRACT 35	44
1.36. PRACTICE ABSTRACT 36	45

ABBREVIATIONS

CAP - Common Agricultural Policy

CLD – Causal loop Diagram

DG AGI - Directorate-General for Agriculture and Rural Development

DG-EMPL - Directorate-General for Employment, Social Affairs and Inclusion

DG-ENER - Directorate-General for Energy

DG ENV - Directorate General for Environment

DG-GROW - Directorate-General for Internal Market, Industry, Entrepreneurship, and SMEs

DG MARE - Directorate-General for Maritime Affairs and Fisheries

DG REGIO - Directorate-General for Regional Policy and Urban Affairs

EIP-AGRI – European Innovation Partnership for Agricultural productivity and Sustainability

ENRD - EU Network for Rural Development

FCM – Fuzzy Cognitive Map

M – month

MA – multi-actor

MAL – Multi-Actor Lab

MS – Milestone

MSFD – Marine Strategy Framework Directive

RD – rural development

SAB – Scientific Advisory Board

SD – System Dynamics

SDG – Sustainable Development Goal

WFD – Water Framework Directive

INTRODUCTION

A "practice abstract" is a short summary of around 1000-1500 characters (word count – no spaces) which describes a main information/recommendation/practice that can serve the end-users (farmers, water managers, coastal city mayors,) with their daily practice. The practice abstracts make innovative knowledge accessible via the EIP-AGRI website¹ for broad dissemination in the common project language (English) and local language. A target number of 108 practice abstracts is foreseen for the COASTAL project, with the following breakdown by reporting period: 36 abstracts for the first reporting period (delivery M18), 36 for the second reporting period (delivery M36), and 36 for the final reporting (delivery M48). All six Multi-Actor Labs and several Work Packages contributed practice abstracts. The topics range from water management and climate adaptation to port development and coastal tourism. Nine abstracts were submitted and have already been published on the EIP-AGRI website².

¹ <http://ec.europa.eu/eip/agriculture/en/content/eip-agri-common-format>

² <https://ec.europa.eu/eip/agriculture/en/find-connect/projects/platform-voor-land-zee-integratie-en-samenwerking>

1. PRACTICE ABSTRACTS REPORTING PERIOD I

1.1. Practice Abstract 1

OBJECTIVES OF THE H2020 PROJECT COASTAL

COASTAL (COllaborative lAnd-Sea inTegration pLatform) engages actors and stakeholders to develop practical business opportunities and policy solutions to improve economic growth while reducing environmental pressure. The main project results are:

- evidence-based business road maps and policy solutions with measurable results and performance indicators;
- an online platform for land-sea knowledge exchange;
- tools and example applications demonstrating the added value of improved land-sea collaboration and the proposed solutions.

Together, these results will help exchange knowledge and expertise between coastal and rural regions in the EU, and understand the mid- and long-term impacts of the decisions taken.

DOELSTELLINGEN VAN HET H2020 PROJECT COASTAL

In COASTAL (COllaborative lAnd-Sea inTegration pLatform) wordt de kennis en ervaring van experts en lokale ondernemers gecombineerd om praktisch bruikbare oplossingen en beleidsaanbevelingen te ontwikkelen. Deze zijn gericht op betere economische ontwikkeling en afname van de milieueffecten. De belangrijkste project resultaten zijn:

- onderbouwde "business road maps" en beleidsoplossingen met meetbare resultaten en indicatoren
- een online platform voor kennisuitwisseling tussen bedrijven, overheden en instellingen gericht op activiteiten in het achterland, de kustzone en op zee
- praktisch inzetbare instrumenten en praktijkvoorbeelden om de meerwaarde van de voorgestelde oplossingen en verbeterde land-zee samenwerking te demonstreren

De resultaten kunnen gebruikt worden om kennis en inzichten uit te wisselen tussen landelijke en kustgebieden in de EU, en te begrijpen welke de gevolgen van beslissingen op (middel) lange termijn zijn.

1.2. Practice Abstract 2

MULTI-ACTOR LAB 1 - BELGIAN COASTAL ZONE

The Belgian "Multi-Actor Lab" focusses specifically on providing business and policy opportunities for a region suffering from intensive use of space and competition for resources, combined with a fragmented governmental context. Along the Belgian coast (67 km length) and its hinterland rural, coastal and sea-based activities such as agriculture, fisheries, agro-food industry, transport, energy production, and recreation are closely interwoven and compete for space, resources and infrastructure. A Marine Spatial Plan is in function, and an updated version covering 2020-2026 will be issued by 2020. COASTAL has the ambition to connect and reinforce the different policies for sustainable use of marine space, exploiting new development opportunities related to blue growth. Offshore energy production entails new jobs and strategic specialisation of port activities and Belgium is one of the leading countries in know-how related to offshore energy production including multi-purpose use of wind farms. Limited water resources and decreasing surface water quality put pressure on the traditional activities in the rural hinterland. A combination of factors leads to increased salinization which poses problems for traditional agriculture but might offer an opportunity for alternative forms of agriculture or aquaculture. Based on the expertise and infrastructure of coastal tourism, developing sustainable rural and/or agro-tourism can provide additional income for the hinterland. Economic and environmental opportunities are found, for example, in sectoral restructuring and modernization, improved integration in the rural food chain with diversification, changes in farming practices and new business opportunities.

MULTI-ACTOR LAB 1 - BELGISCHE KUSTZONE

Het Belgische "Multi-Actor Lab" richt zich specifiek op zakelijke en beleidskansen voor een regio die lijdt onder intensief ruimtegebruik en concurrentie om middelen, gecombineerd met een gefragmenteerde overheidscontext. Langs de Belgische kust (67 km lang) en het achterland zijn landelijke, kust- en zeegebaseerde activiteiten zoals landbouw, visserij, agrovoedingsindustrie, transport, energieproductie en recreatie nauw verweven en in competitie voor ruimte, middelen en infrastructuur. Een marien ruimtelijk plan is in functie en de bijgewerkte versie voor 2020-2026 zal uiterlijk in 2020 worden uitgebracht. COASTAL heeft de ambitie om verschillende beleidsopties voor de mariene ruimte te versterken door nieuwe ontwikkelingskansen met betrekking tot Blauwe Groei te benutten. Offshore energieproductie brengt nieuwe banen en strategische specialisatie van havenactiviteiten met zich mee en België is een van de leidende landen in de know-how met betrekking tot offshore energieproductie, waaronder multifunctioneel gebruik van windparken. Beperkte watervoorraden en afnemende oppervlaktekwaliteit verhogen de druk op het achterland. Een combinatie van factoren leidt tot verhoogde verzilting, wat problemen oplevert voor de traditionele landbouw, maar mogelijk een kans biedt voor alternatieve vormen van landbouw of aquacultuur. De expertise en infrastructuur van kusttoerisme kan mogelijk benut worden voor de ontwikkeling van duurzaam platteland en / of agro-toerisme, en zo extra inkomsten voor het achterland opleveren. Andere voorbeelden zijn sectorale herstructurering en modernisering, verbeterde integratie in de landelijke voedselketen met diversificatie, en veranderingen in landbouwpraktijken.

1.3. Practice Abstract 3

TOOLS FOR BUSINESS ANALYSIS

COASTAL adopts an interactive Systems Dynamics approach for supporting business decisions. System Dynamics or SD modelling is widely used since the 1950s for problem analysis in applications ranging from logistics, control management, engineering and financial management to public policy. Clients and business analysts interact with design Causal Loop Diagrams (CLDs). These are graphical models explaining the underlying dynamics of the problem resulting from the combination of reinforcing and balancing feedback mechanisms. Quantification of the CLDs allows for further analysis, such as the pinpointing of 'tipping points'. Typical questions answered are: why do certain businesses fail and others not under similar circumstances? Why do certain management strategies work on the short term, but not on the long term? Although the human brain is capable of providing part of the answer this becomes more difficult when multiple factors play a role. This is certainly true for complex social-environmental systems such as coastal regions which are densely used and rapidly developing, with economic activities competing for resources such as space, water, and skilled labor. A tutorial example was demonstrated during the project kickoff meeting, showing the interaction between tourism, pressure on space and the attractiveness of a coastal region for new tourists. Limiting the total number of tourists can be necessary to avoid economic collapse of tourism. The true strength of SD modelling lies in the transparency of the graphical models, enabling interactive design and use of the models, the limited data requirements and high computing speed.

INSTRUMENTARIUM VOOR BEDRIJFSANALYSE

COASTAL hanteert een interactieve systeem-dynamische benadering voor het ondersteunen van zakelijke beslissingen. Systeemdynamica of SD-modellering wordt al sinds de jaren vijftig veel gebruikt voor probleemanalyse in toepassingen variërend van logistiek, controlebeheer, engineering en financieel beheer tot openbaar beleid. Klanten en bedrijfsanalisten ontwerpen samen Causale relatiediagrammen. Dit zijn grafische modellen die de onderliggende dynamiek van het probleem verklaren - het resultaat van de combinatie van versterkende en balancerende feedbackmechanismen. Kwantificering van deze diagrammen maakt verdere analyse mogelijk, zoals het lokaliseren van 'tipping points'. Typische vragen die beantwoord kunnen worden zijn: waarom falen bepaalde bedrijven en anderen niet onder vergelijkbare omstandigheden? Waarom werken bepaalde managementstrategieën op de korte termijn, maar niet op de lange termijn? Hoewel het menselijke brein in staat is om een deel van het antwoord te leveren, wordt dit moeilijker wanneer meerdere factoren een rol spelen. Dit geldt zeker voor complexe sociaal-ecologische systemen zoals kustregio's die intensief worden gebruikt en zich snel ontwikkelen, waarbij economische activiteiten in competitie zijn om hulpbronnen zoals ruimte, water en geschoolde arbeidskrachten. Tijdens de kickoff-bijeenkomst van het project werd een schoolvoorbeeld getoond, waarin de interactie tussen toerisme, druk op de ruimte en de aantrekkelijkheid van een kustgebied voor nieuwe toeristen werd toegelicht. Het beperken van het totale aantal toeristen kan nodig zijn om een economische neergang van het toerisme te voorkomen, afhankelijk van de capaciteit van de regio. De echte kracht van SD-modellering schuilt in de transparantie van de grafische modellen, wat interactief ontwerp en gebruik van de modellen mogelijk maakt, de beperkte gebruik van gegevens en hoge rekensnelheid.

1.4. Practice Abstract 4

MULTI-ACTOR LAB 05 - DANUBE DELTA

The ICEADR coordinated „Multi Actor” laboratories’ main objective is to carry out consultations with representatives of the governmental units, academia, local communities and authorities, local actors, as well as stakeholders, in order to identify and analyse the problems in the Danube Delta region, from an integrated perspective, taking into account the economic, social, cultural and environmental factors. The analysis includes the Danube Delta Biosphere Reserve and its adjacent areas, each of one of this has different characteristics. The main economic activities identified are tourism, agriculture, fisheries and aquaculture. Danube Delta is declared a living museum of biodiversity, which attracts on average only 1% of the total number of tourists visiting Romania (Romanian or foreign tourist). Due to the richness and cultural diversity, there are opportunities for tourism, agriculture, and crafts workshops. Fisheries and aquaculture remain a field of interest for the area, representing a significant source of income for the population living in the coastal rural area and the Danube Delta. There are identified opportunities for job growth through fishing and aquaculture, processing, marketing, diversification of alternative and complementary activities (environmental activities, ecotourism, education) that will contribute to economic growth and environmental protection.

LABORATOARELE MULTI-ACTOR 05 - DELTA DUNARII

Laboratoarele "Multi-actor" desfășurate sub coordonarea ICEADR au ca scop realizarea de consultari cu reprezentanti ai unitatilor guvernamentale, ai mediului academic, ai comunitatilor locale si autoritatilor, ai actorilor locali, precum si ai partilor interesate in vederea identificarii si analizarii problemelor existente in regiunea Delta Dunarii, dintr-o perspectiva integrata, tinand cont de factorii economici, sociali, culturali si de mediu. Analiza cuprinde Rezervatia Biosferei Delta Dunarii si zonele sale limitrofe, fiecare dintre acestea avand caracteristici diferite. Principalele activități economice identificate sunt: turismul, agricultura, pescuitul si acvacultura. Delta Dunării este declarata un muzeu viu al biodiversitatii, lucru care atrage în medie, o pondere de doar 1% din numărul total al turiștilor care vizitează România (autohtoni sau străini). Datorita bogatiei si diversitatii culturale exista oportunitati de dezvoltare a turismului, agriculturii, precum si a atelierelor de mestesugarit. Pescuitul si acvacultura raman un domeniu de interes al zonei, reprezentand o sursa de venituri importanta pentru o parte a populatiei din arealul rural costier si din Delta Dunarii. Sunt identificate oportunitati pentru cresterea locurilor de munca prin pescuit si acvacultura, procesare, marketing, diversificarea activitatilor alternative si complementare (activitati de mediu, ecoturism, educatie) ce vor contribui la cresterea economica si la protectia mediului.

1.5. Practice Abstract 5

CASE STUDY: WESTERN MESSINIA

Agriculture (mainly olive trees) and coastal tourism are the two major economic activities in Western Messinia, Greece. Tourism is expanding and goes hand in hand with infrastructure development (hotels, roads and airports) and can provide opportunities for diversified livelihoods, but also increases pressures on the environment and cultural sites. Coastal areas are also affected by agrochemicals, soil erosion, solid waste landfills, and waste waters. In particular waste products from olive production form a threat to surface and coastal water quality. Climate change is expected to increase coastal erosion and decrease the availability of freshwater, with increased risk for saltwater intrusion into coastal wetlands and aquifers. There are also plans for offshore oil and gas exploration that will have implications for the area's rich coastal biodiversity. The study area comprises several important cultural sites and Mediterranean habitats included in the reference list of the Natura 2000 initiative. The MAL will develop a number of alternative strategies for local economic development that will allow a diversification and strengthening of a sustainable local economy while minimizing the impact on the Natura 2000 sites. Long-term planning for sustainable tourism and agriculture will take into account resilience to future changes in climate, exploiting the expertise and experience of local stakeholders.

ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ: ΔΥΤΙΚΗ ΜΕΣΣΗΝΙΑ

Οι αγροτικές δραστηριότητες (κυρίως οι ελαιοκαλλιέργειες) και ο παράκτιος τουρισμός είναι οι δύο πολύ σημαντικές οικονομικές δραστηριότητες στη Δυτική Μεσσηνία. Ο τουρισμός αναπτύσσεται συνέχεια και συμβαδίζει με την ταυτόχρονη ανάπτυξη υποδομών (ξενοδοχεία, δρόμοι και αεροδρόμια) και ενώ μπορεί να προσφέρει ευκαιρίες για ποιοτικά μέσα διαβίωσης, παράλληλα αυξάνει τις πιέσεις στο περιβάλλον και τα πολιτιστικά μνημεία. Οι παράκτιες περιοχές επηρεάζονται επίσης από τα αγροχημικά προϊόντα, τη διάβρωση του εδάφους, τους χώρους υγειονομικής ταφής απορριμάτων και τα λύματα. Συγκεκριμένα, τα απόβλητα από την παραγωγή ελιάς απειλούν την ποιότητα τόσο των υδάτων στην επιφάνεια της θάλασσας όσο και σε μεγαλύτερα βάθη σε παράκτιες περιοχές. Οι κλιματικές αλλαγές αναμένεται να αυξήσουν τη διάβρωση των ακτών και να μειώσουν τη διαθεσιμότητα των γλυκών νερών, με αυξημένο κίνδυνο διείσδυσης θαλασσινού νερού σε παράκτιους υγροτόπους και υδροφορείς. Υπάρχουν επίσης σχέδια για υπεράκτιες πλατφόρμες πετρελαίου και φυσικού αερίου που θα έχουν και αυτές επιπτώσεις στην πλούσια βιοποικιλότητα της περιοχής. Η περιοχή μελέτης περιλαμβάνει σημαντικά πολιτιστικά μνημεία και μεσογειακούς οικοτόπους που περιλαμβάνονται στο δίκτυο των προστατευόμενων περιοχών Natura 2000. Το MAL θα αναπτύξει πολλαπλές εναλλακτικές στρατηγικές για την ανάπτυξη της τοπικής οικονομίας που θα βοηθήσουν στην ενίσχυση μιας βιώσιμης τοπικής οικονομίας, ελαχιστοποιώντας ταυτόχρονα τις επιπτώσεις στις περιοχές Natura 2000. Ο μακροπρόθεσμος σχεδιασμός για την επίτευξη ενός βιώσιμου μοντέλου τουρισμού και γεωργίας θα λάβει επίσης υπόψη την αντοχή του οικοσυστήματος στις επερχόμενες κλιματικές αλλαγές, αξιοποιώντας την γνώση και εμπειρία των τοπικών φορέων.

1.6. Practice Abstract 6

KNOWLEDGE TRANSITION - HCMR

Knowledge transition in COASTAL develops the quantitative data and scientific model constructs (types of data and associated models) needed for synergistic analysis of the social-economic, physical, and environmental coastal-rural interactions identified at the beginning of the project, between coastal and rural stakeholders, actors, and researchers in six case studies across Europe (Multi-Actor Labs). Mental mapping will allow grouping similar issues through a bottom-up approach, ensuring an optimal exchange of qualitative understanding of the coastal and rural development factors between the case studies. This model work plan includes guidelines on how to address the modelling of interactions including social-economic, environmental and institutional conditions for each case study, supporting business and policy analyses. For example, the combined effect of hinterland pressures lead to changes in the coastal environment e.g. water and sediment flow changes are associated to variations in drought, flood risks, and coastal erosion, pressures of agricultural practices lead to variations of nutrient and pollutant loads from land to the sea. Together with trends on tourism, fisheries, transportation, and other economy-related variables, all are integrated within a dynamics modeling framework to support business and policy.

ΑΝΤΑΛΛΑΓΗ ΓΝΩΣΗΣ - HCMR

Στόχος είναι να επεξεργαστούν τα δεδομένα και να τεθούν σε λειτουργία τα μοντέλα που απαιτούνται για την ανάλυση των αλληλεπιδράσεων μεταξύ αγροτικών και παράκτιων περιοχών όπως αυτά εντοπίστηκαν στην αρχή του προγράμματος. Αυτές οι πληροφορίες θα πρέπει να μεταφραστούν λεπτομερώς για την περαιτέρω ανάλυση που αφορά επιχειρήσεις και χάραξη πολιτικής. Οι εργασίες αυτές θα βασιστούν στα αποτελέσματα της εννοιολογικής ανάλυσης των παράκτιων και αγροτικών περιοχών που θα συζητηθούν από τοπικούς φορείς και ερευνητές στα θεματικά εργαστήρια. Θα δοθεί έμφαση στη μετάφραση των υπάρχοντων δεδομένων και μοντέλων για τον ποσοτικό προσδιορισμό των κοινωνικο-οικονομικών, φυσικών και περιβαλλοντικών αλληλεπιδράσεων. Το πιο σημαντικό είναι ότι θα αναπτυχθούν οι γενικές αρχές προκειμένου να διευκολυνθεί η ανταλλαγή γνώσεων μεταξύ των περιοχών μελέτης.

1.7. Practice Abstract 7

MULTI-ACTOR LAB 06 - MAR MENOR - CSIC

The Mar Menor coastal lagoon (135 km²) is located in the Region of Murcia (SE Spain). The area is characterized by multiple environmental, socio-cultural and economic interests, often competing for scarce resources, with water being the most important. There is a high potential for complementarity, win-win scenarios and development of sustainable business cases based on public-private collaboration, efficient use of water, and innovative farming practices and a transition to sustainable models of tourism and agriculture. The catchment draining into the Mar Menor covers an area of 1.255 km² and is mainly covered by intensive irrigated agriculture and tree crops. The intensive and highly profitable irrigated agriculture depends on scarce low-quality groundwater and water from inland inter-basin water transfers. Agriculture provides labor and income to the region but forms a source of excessive nutrients and contamination into the Mar Menor coastal lagoon. The resulting poor water quality affects the ecology of the lagoon with severe implications for its potential function for tourism and fisheries. The coastal lagoon forms part of a Specially Protected Area of Mediterranean Importance (SPAMI). The Mar Menor is one of the hotspots for tourism in the Region of Murcia, with a total number of 346,000 tourists and 1.4 million over-night stays in 2016. Beside international visitors, the Mar Menor has an important touristic function for the regional population (1.5 million inhabitants). The availability of water for irrigation and drinking for tourism will be further reduced under future climate conditions. As such, the Mar Menor is strongly influenced by interactions between inland agriculture on the one side, and coastal tourism and fisheries affecting natural ecological values and socioeconomic sustainability on the other side. The need to move towards sustainable modes of agriculture, fishery and tourism are increasingly recognized and recently revived strongly due to a sudden increase in contamination levels resulting in a strong drop in tourism.

PLATAFORMA MULTI-SECTORIAL 6 - MAR MENOR - CSIC

La laguna costera del Mar Menor (135 km²) se encuentra en la Región de Murcia (SE de España). El área se caracteriza por múltiples intereses ambientales, socioculturales y económicos, a menudo compitiendo por recursos escasos, siendo el agua el más importante. Existe un alto potencial de desarrollo de casos empresariales sostenibles basados en la colaboración público-privada con escenarios beneficiosos para todos, basados en el uso eficiente del agua, prácticas agrícolas innovadoras y la transición a modelos sostenibles de turismo y agricultura. La cuenca hidrológica que desemboca en el Mar Menor tiene una superficie de 1.255 km² y está cubierta principalmente por agricultura intensiva de regadío y cultivos arbóreos. La agricultura de regadío intensiva y altamente rentable depende de las escasas aguas subterráneas de baja calidad y del agua del transvase Tajo-Segura. La agricultura proporciona mano de obra e ingresos a la región, pero constituye una fuente de nutrientes y contaminación excesiva en la laguna costera del Mar Menor. La mala calidad del agua resultante afecta gravemente a la ecología de la laguna con graves implicaciones para su servicio potencial para el turismo y la pesca. La laguna costera forma parte de un Área Especial Protegida de Importancia Mediterránea (SPAMI). El Mar Menor es uno de los puntos clave del turismo en la Región de Murcia, con un total de 346,000 turistas y 1,4 millones de estadias nocturnas en 2016. Además de los visitantes internacionales, el Mar Menor tiene un importante papel recreativo para la población regional (1,5 millones

de habitantes). Además, la disponibilidad de agua para riego y agua potable para el turismo se reducirá aún más en las condiciones climáticas futuras. El Mar Menor está fuertemente influenciado por las interacciones entre la agricultura, el turismo costero y la pesca que afectan a sus valores ecológicos naturales y a la sostenibilidad socioeconómica de sus habitantes. La necesidad de avanzar hacia modos sostenibles de agricultura, pesca y turismo es cada vez más reconocida en la región y recientemente revivió con fuerza debido al aumento repentino en los niveles de contaminación en la laguna y su colapso ecológico, que resultaron en una fuerte caída del turismo.

1.8. Practice Abstract 8

MULTIACTOR LAB 4 CHARENTE RIVER BASIN - IRSTEA

The Charente river case study is characterized by a strong agricultural activity mainly in the hinterland with shellfish farming and tourism activities in the downstream part of the basin. The overarching aim of the Multi-Actor Labs for the Charente river basin is to contribute to sustainable rural and coastal regional development for activities facing conflicting issues surrounding water (quantity and quality) in the context of climate change. It intends to collectively find out robust, long-term solutions for developing innovative chain values for agriculture, shellfish, and fishing activities, sustainable tourism both on coastal and hinterland areas taking into account environmental constraints. Development of existing port installations for increasing shipping activities and opportunities for renewable marine energies and wind energies will be discussed. Interactions between these different economic activities and impact of possible scenarios (on the regional economy, the land use, the employment, and the environment) will be addressed. The objective is to collectively share a common strategic vision to guide recommendations for a future sustainable territorial development.

LABORATOIRE MULTIACTEUR 4 BASSIN DU FLEUVE CHARENTE - IRSTEA

L'étude de cas du fleuve Charente se caractérise par une forte activité agricole, dans la partie amont du bassin, avec une conchyliculture développée et une activité touristique élevée dans la partie aval. L'objectif global des laboratoires multi-acteurs pour le bassin du fleuve Charente est de contribuer à un développement régional durable pour les activités confrontées à des problèmes conflictuels concernant l'eau (quantité et qualité) dans le contexte du changement climatique. L'ambition est de trouver collectivement des solutions solides et de long terme pour développer des chaînes de valeur innovantes pour l'agriculture, l'aquaculture et les activités de pêche, et un tourisme durable tant sur les zones côtières que dans l'arrière-pays, en tenant compte des contraintes environnementales. Le développement des installations portuaires existantes pour accroître le fret maritime et les opportunités offertes par les énergies marines renouvelables et les énergies éoliennes seront discutés. Les interactions entre ces différentes activités économiques et l'impact des scénarios possibles (sur l'économie régionale, l'utilisation des terres, l'emploi et l'environnement) seront abordés. L'objectif final est de partager collectivement une vision stratégique commune comme feuille de route pour guider les recommandations pour un futur développement territorial durable.

1.9. Practice Abstract 9

MULTI-ACTOR LAB 3 - NORRSTRÖM / BALTIC SEA - SU

The Norrström drainage basin and its surrounding coastal areas, including the Swedish capital Stockholm, represent the relatively densely populated, mixed urban, agricultural and industrial coastal areas and their catchments around the Baltic Sea. The nutrient loads from these areas into the coastal and marine waters constitute major human pressures on water quality, resulting in eutrophication, hypoxia and recurrent algae blooms. The Multi-Actor Lab approach applied to the Norrström / Baltic Sea case brings together scientists, decision makers, local stakeholders and business sectors to discuss and exchange their experiences and expertise regarding various rural-to-coastal development scenarios and how they may affect these environmental problems and their drivers and possible solutions. Such face-to-face interactions are a backbone of our rural-coastal interaction analysis and provide a realistic overview of different land and sea perspectives on coastal development and associated environmental problems and their possible solutions. Based on this overview, MAL3 will address development scenarios, strategies and plans at the local Norrström and regional Baltic scale, considering land-, coast- and sea-based sectors such as agriculture, urban areas, industry, fisheries, aquaculture, infrastructure, tourism, along with ongoing and future climate change. MAL3 is led by Stockholm University with ambitious aims to identify sustainable development and solution opportunities related to green and blue growth, rural-urban and marine spatial planning, and biodiversity and ecosystem functions in the Baltic Sea.

MULTIAKTÖRSLAB 3 - NORRSTRÖM / ÖSTERSJÖN - SU

Norrströms avrinningsområde och dess omgivande kustområden, inklusive huvudstaden Stockholm, representerar relativt tätbefolkade kustområden och deras avrinningsområden runt Östersjön, med blandad stads-, jordbruks- och industriell användning av marken. Näringsämnen från dessa områden sprids vidare till kust- och havsvatten där de utgör ett stort mänskligt tryck på vattenkvaliteten, med övergödning, syrebrist och återkommande algbloomningar som resultat. Multiaktörsangreppssättet tillämpat på Norrström/Östersjöfallstudien samlar forskare, beslutsfattare, lokala aktörer och näringsliv för att diskutera och utbyta erfarenheter och expertis kring olika utvecklingsscenarier för landsbygden och kusten och hur de kan påverka dessa miljöproblem och deras orsaker och möjliga lösningar. Sådana direkta interaktioner är en central del av vår analys och ger en realistisk översikt över olika lands- och havsperspektiv på kustutvecklingen och relaterade miljöproblem och möjliga lösningar. På basis av denna översikt kommer MAL3 att identifiera utvecklingsscenarier, strategier och planer på olika nivåer, lokalt (Norrström) och regionalt (Östersjö), med hänsyn till land-, kust- och havsbaserade sektorer, som jordbruk, städer, industri, fiske, vattenbruk, infrastruktur, turism, tillsammans med pågående och framtida klimatförändringar. MAL3 leds av Stockholms universitet med ambitiösa mål att identifiera hållbara utvecklings- och lösningsmöjligheter i relation till grön och blå tillväxt, stads- och landsbygdsplanering samt biologisk mångfald och ekosystemfunktioner i Östersjön.

1.10. Practice Abstract 10

UNDERSTANDING THE COMPLEXITY OF WATER SCARCITY

The impacts of climate change are becoming more and more prominent, notable by the increasing frequency and significance of periods of drought. Scarcity of fresh drinking water, combined with high usage in industry and agriculture, has led to a problem faced by many coastal regions in Europe, including West- and East Flanders. The depletion of groundwater reserves due to successive droughts is a growing concern and regularly reported by the Belgian media. The interactions between the changing climate, water demand and reserves, developing water engineering technology and increased public awareness are complex and uncertain, calling for a systemic view with a mid- to long-term timeline. This is one of the reasons why visionary scenario planning must rely on narratives, stakeholder interactions, and conceptual analyses. Predictive computer simulations used to model future scenarios can be useful but are often based on linear extrapolations of historic data and other assumptions. The COASTAL partners are currently developing a set of systemic tools to visualise complex resource dynamics in a user-friendly way. For example, a pilot model for water scarcity is being tested to understand the long-term impacts of changing water demand and ground water resources, including adaptive water use behaviour. Results are promising and point to a clear difference between the short-, mid- and long-term shortage of fresh water. These will be further discussed with the stakeholders involved in the COASTAL project (<https://h2020-coastal.eu>).

DE COMPLEXITEIT VAN WATERSCHAARSTE BEGRIJPEN

De gevolgen van de klimaatverandering worden steeds duidelijker, met name door de toenemende frequentie en betekenis van perioden van droogte. De schaarste aan zoet drinkwater, in combinatie met het hoge gebruik in de industrie en de landbouw, heeft geleid tot een probleem waarmee veel kustregio's in Europa, waaronder West- en Oost-Vlaanderen, te kampen hebben. De uitputting van de grondwaterreserves als gevolg van opeenvolgende droogteperiodes is een groeiende zorg en wordt regelmatig gerapporteerd in de Belgische media. De interacties tussen het veranderende klimaat, de watervraag en -reserves, de ontwikkeling van watertechnologie en de toegenomen bewustwording van het publiek zijn complex en onzeker en vragen om een systemische visie met een tijdslijn op middellange tot lange termijn. Dit is een van de redenen waarom visionaire scenarioplanning moet steunen op verhaallijnen, interacties met belanghebbenden en conceptuele analyses. Voorspellende computersimulaties die gebruikt worden om toekomstscenario's te modelleren kunnen nuttig zijn, maar zijn vaak gebaseerd op lineaire extrapolaties van historische gegevens en andere aannames. De COASTAL partners ontwikkelen momenteel een reeks systemische hulpmiddelen om complexe hulpbronnendynamiek op een gebruiksvriendelijke manier te visualiseren. Zo wordt bijvoorbeeld een proefmodel voor waterschaarste getest om inzicht te krijgen in de langetermijneffecten van veranderende watervraag en grondwatervoorraden, inclusief adaptief watergebruiksgedrag. De resultaten zijn veelbelovend en wijzen op een duidelijk verschil tussen het tekort aan zoet water op korte, middellange en lange termijn. Deze zullen verder worden besproken met de belanghebbenden die betrokken zijn bij het COASTAL project (<https://h2020-coastal.eu>).

1.11. Practice Abstract 11

ENGAGING STAKEHOLDERS FOR SUSTAINABILITY IN THE MAR MENOR COASTAL LAGOON, SPAIN

The EU funded COASTAL project (<https://h2020-coastal.eu>) aims to develop an understanding of land-sea interactions and use this information to improve the economic development of coastal regions in a sustainable manner. Engaging stakeholders in policy analysis is the current-day standard. Broad support from citizens, business and local administrations is essential for the effectiveness of management strategies during the implementation phase. In addition, stakeholders can bring in useful insights on the priorities and opportunities for sustainable development, and local knowledge - referred to as a 'participatory modelling'. Cross-sectoral collaboration can help identify the main system variables and interactions affecting sustainability but proves to be difficult. Participatory approaches to map and model the dynamics of resource exploitation can help create mutual understanding, paving the way for collective action to restore the ecosystems. This, however, is a challenging task, often touching upon dormant or active resource conflicts or different value systems.

Power imbalances, conflicts between stakeholders or economic sectors can often impede effective collaboration. The most effective way is to start with sectorial workshops followed by multi-actor exchanges bringing together representatives from each sector. Fuzzy cognitive maps and causal loop diagrams were designed interactively together with the sector stakeholders. These are now used to generate innovative solutions for sustainable business development with common ownership.

INVOLUCRANDO A LAS PARTES INTERESADAS PARA LA SOSTENIBILIDAD EN LA LAGUNA COSTERA DEL MAR MENOR, ESPAÑA

El proyecto COASTAL, financiado por la UE (<https://h2020-coastal.eu>), tiene por objeto desarrollar la comprensión de las interacciones tierra-mar y utilizar esta información para mejorar el desarrollo económico de las regiones costeras de manera sostenible. La práctica actual es involucrar a las partes interesadas en el análisis de políticas. Un amplio apoyo de los ciudadanos, las empresas y las administraciones locales es esencial para la eficacia de las estrategias de gestión durante la fase de aplicación. Además, las partes interesadas pueden aportar ideas útiles sobre las prioridades y oportunidades para el desarrollo sostenible y el conocimiento local mediante "modelización participativa".

La colaboración intersectorial puede ayudar a identificar las principales variables e interacciones del sistema que afectan a la sostenibilidad, pero resulta difícil. Los enfoques participativos para mapear y modelar la dinámica de la explotación de los recursos pueden ayudar a crear un entendimiento mutuo, allanando el camino para la acción colectiva para restaurar los ecosistemas. Sin embargo, esta es una tarea difícil, que a menudo se refiere a conflictos de recursos latentes o activos o a sistemas de valores diferentes.

Los desequilibrios de poder, los conflictos entre las partes interesadas o los sectores económicos a menudo pueden impedir una colaboración eficaz. La forma más eficaz es comenzar con talleres sectoriales seguidos de intercambios multilaterales que reúnan a representantes de cada sector. Se diseñaron mapas cognitivos y diagramas causales de forma interactiva junto con las partes interesadas de cada sector. Estos se utilizan ahora para generar soluciones innovadoras para el desarrollo de negocios sostenibles entre todos los actores interesados.

1.12. Practice Abstract 12

ADVANTAGES OF SUSTAINABLE FARMING BUSINESS MODELS

Intensive large-scale monocultures are an important driver of land degradation and greenhouse gas emissions. This land degradation often leads to a loss of biodiversity, soil quality and crop yields, contamination and overexploitation of scarce ground and surface water resources, reduced drought resilience, and increased frequency and severity of floods. New farming business models are needed based on regenerative and agroecological practices such as conservation tillage and crop diversification, both of which can increase resilience and economic viability of agriculture while reducing greenhouse gas emissions.

The key assumptions are that diversified and low input farming systems have positive environmental impacts with higher crop yields and less harvest failure and that customers are prepared to pay a higher price for sustainably produced food products.

Diversifying a cropping system by using intercropping and crop rotations is not easy and a lot is unknown about how to optimise the benefits. It may take a long time before crop yields increase after implementation of diversified cropping systems. Environmental conditions such as the annual climate conditions strongly determine the outcomes. The potential of crop diversification is also examined in the EU funded project COASTAL (<https://h2020-coastal.eu>). The suggestion made is to adjust the type of crop diversification and low input farming to the local farming conditions. The European crop diversification cluster (<https://www.cropdiversification.eu/>) brings together research projects to increase the impact of crop diversification. The cluster encourages the uptake of diversification measures by farmers in the EU through innovation. MAL page: <https://h2020-coastal.eu/mar-menor-coastal-lagoon>

VENTAJAS DE LOS MODELOS DE NEGOCIO AGRÍCOLAS SOSTENIBLES

Los monocultivos intensivos a gran escala son un factor importante de la degradación de la tierra y de las emisiones de gases de efecto invernadero. Esta degradación de la tierra a menudo conduce a una pérdida de biodiversidad; de la calidad del suelo y del rendimiento de las cosechas; a la contaminación y a la sobreexplotación de los escasos recursos de agua subterránea y superficial; a la reducción de la resiliencia a la sequía y al aumento de la frecuencia y severidad de las inundaciones. Se necesitan nuevos modelos empresariales agrícolas basados en prácticas regenerativas y agroecológicas como la labranza de conservación y la diversificación de cultivos para aumentar la resistencia, la viabilidad económica de la agricultura y la reducción de las emisiones de gases de efecto invernadero.

Los supuestos clave se basan en que los sistemas agrícolas diversificados y de bajos insumos tienen impactos ambientales positivos, con un mayor rendimiento de los cultivos y menor número de malas cosechas, así como que los clientes están dispuestos a pagar un precio más alto por los productos alimenticios producidos de forma sostenible.

Diversificar un sistema de cultivo mediante el uso de cultivos intercalados y rotaciones de cultivos no es fácil y se desconoce mucho sobre cómo optimizar los beneficios. Puede pasar mucho tiempo antes de que el rendimiento de los cultivos aumente realmente después de la implementación de sistemas de cultivo diversificados. Tanto las condiciones ambientales, como las condiciones climáticas anuales, determinan en gran medida los resultados. El potencial de la diversificación de cultivos también se examina en el proyecto

COASTAL, financiado por la UE (<https://h2020-coastal.eu>). La sugerencia que se hace es ajustar el tipo de diversificación de cultivos y la agricultura de bajos insumos a las condiciones agrícolas locales. El grupo europeo de diversificación de cultivos (<https://www.cropdiversification.eu/>) reúne proyectos de investigación para aumentar el impacto de la diversificación de cultivos, fomentando así la adopción de medidas de diversificación por parte de los agricultores de la UE a través de la innovación.

1.13. Practice Abstract 13

SHELLFISH FARMING AND WATER QUALITY

Shellfish are filter feeders whose health depends on the coastal water quality where they are raised. As in almost all aquaculture production sectors, shellfish farms are in coastal areas that are productive but dependent on terrestrial inputs from river basins. Shellfish farmers, accountable for healthy food products, depend on water quality that they do not directly control. Different strategies are available to them at four levels:

- 1- Business-as-usual: trust the existing water quality monitoring networks and regulations (EU-Water Framework Directive and Marine Strategy Framework Directive) and the means implemented to reach the thresholds required for fish farming and sanitary quality of shellfish.
- 2- Involvement: become legitimate and actively participate in the structures responsible for the management of the quality of fluvial, coastal and offshore waters.
- 3- Water engineering: develop innovative techniques for purifying shellfish to overcome the quality of coastal waters.
- 4- Spatial planning: relocate shellfish farms to areas where the water quality is either better with regard to health issues, the trophic conditions, or both.

Together with the stakeholders, COASTAL partners are currently developing interactive tools to examine and compare the potential impact of these strategies (<https://h2020-coastal.eu>).

MAL page: <https://h2020-coastal.eu/charente-river-basin>

CONCHYLICULTURE ET QUALITÉ DES EAUX

Les coquillages sont des filtreurs dont la qualité sanitaire dépend de la qualité d'eau dans laquelle ils sont élevés. Dans le secteur étudié et comme dans la quasi-totalité des secteurs européens de production, les coquillages sont situés dans des zones littorales, productives et dépendantes des apports terrestres issus des bassins versants. Les conchyliculteurs, responsables de la qualité sanitaire de leurs produits, sont dépendants d'une qualité d'eau qu'ils ne maîtrisent pas directement. Leur action peut se situer sur quatre niveaux:

- 1- Faire confiance aux réseaux de surveillance de la qualité des eaux (Directive Cadre sur l'Eau et Directive Cadre Stratégique Milieu Marin) et aux moyens mis en œuvre pour atteindre les seuils requis pour l'élevage et la qualité sanitaire des coquillages
- 2- Se rendre légitime et intervenir activement dans les structures engagées dans la gestion de la qualité des eaux fluviales, littorales et côtières.
- 3- Développer des techniques d'épuration des coquillages permettant de s'affranchir de la qualité des eaux littorales.
- 4- Délocaliser leurs élevages dans des zones dont la qualité des eaux est, soit meilleure au regard des questions sanitaires, soit meilleure au regard des questions trophiques, soit des deux.

1.14. Practice Abstract 14

PORTS AND THE ENERGY TRANSITION

As a point of entry and exit for material and non-material flows, ports lie at the heart of coastal-rural interdependencies. Situated at the land/sea interface, their ecological transition strategies are influenced by decisions taken by others (e.g., other ports, other sectors). Some ports regard this interdependence as beyond their sphere of influence. Others seek instead to govern it through developing a political role of ‘intermediary actor’ shaping the ecological transition of local port community and wider commercial dynamics. Ports’ investment in this role depends on their political status and their willingness to reduce their environmental impact; their capacity to mobilise those resources at their disposal (economic, institutional, territorial, etc.); their effectiveness in building alliances with other actors; and the type of governing structures in which they participate.

Ports seeking to govern a policy of de-carbonisation can take the following actions along a land/sea gradient:

1. Implement a local circular economy coordinating port community industries inhabiting the port place;
2. Invest in alternative energy sources, e.g. become a platform for territorial development of wave and wind energy;
3. Bring about a modal shift, e.g., moving from road to rail and sea transport;
4. Build alliances and contribute to governing strategies and public policies at different scales.

The COASTAL project will help highlight how ports can this way promote new territorial interdependencies between infrastructure, nature and society.

MAL page: <https://h2020-coastal.eu/charente-river-basin>

PORTS ET TRANSITION ÉNERGÉTIQUE

En tant que point d'entrée et de sortie de flux matériels et immatériels, les ports sont au cœur d'interdépendances littorales et rurales. Situés à l'interface « terre-mer », leurs stratégies de transition écologique sont influencées par les décisions prises par d'autres acteurs (i.e. d'autres ports ou secteurs). Certains ports considèrent ces interdépendances en dehors de leur influence ; d'autres cherchent à orienter ces dynamiques au sein de la place portuaire et au travers de relations commerciales élargies en développant un rôle « d'acteur intermédiaire » dans la gouvernance de la transition écologique. Cet investissement dépend de leur statut politique et de leur volonté à réduire leur impact environnemental ; de la façon dont ils mobilisent les ressources dont ils disposent (économiques, institutionnelles, etc.) ; ou encore des alliances qu'ils nouent et des structures de gouvernance auxquelles ils participent.

Les ports cherchant à gouverner une politique de dé-carbonisation peuvent structurer leurs actions sur un gradient « terre-mer » :

1. En mettant en place une économie circulaire locale coordonnant les entreprises de la place portuaire;
2. En investissant dans les sources d'énergies alternatives marines en devenant une plateforme pour le développement territorial de l'énergie houlomotrice et éolienne ;
3. En développant un transfert modal (i.e. passer de la route au rail) et le cabotage ;

4. En construisant des alliances et en contribuant à la gouvernance et aux politiques publiques à différentes échelles.

Le projet COASTAL aidera à mettre en évidence comment les ports pourraient promouvoir ainsi de nouvelles interdépendances territoriales entre infrastructures, nature et société.

1.15. Practice Abstract 15

SCENARIO NARRATIVES - RURAL TOURISM IN COASTAL REGIONS

The Romanian MAL (Multi-Actor Laboratory) was organised at the beginning of September 2019. The stakeholders' group included representatives from rural and coastal tourism, agriculture, aquaculture, fishing and local administration. The aim was to build on the outcomes of the sectorial COASTAL workshops, confirmation of drivers and variables and linkages between them and identification of further narratives for sustainable development in the upcoming 5 to 30 years.

The discussion led to the conclusion that the tourism sector in Danube Delta area, in its traditional form, will evolve to a broader sense, including various connected activities, bringing more value to the visitors. Alternative tourism is enhancing a closer relation between visitors and the local community. The visitors will use or share the services of local people, exploring the preserved natural environment, authentic atmosphere and cuisine, and local traditions. This kind of tourism is regarded as a key to sustainable development.

An interesting development direction that was pointed out is the transition to agritourism with a specific interest towards food tourism (culinary delights, wine tasting, etc.), cultural or heritage tourism (due to the large variety of ethnic communities in the coastal area), scientific tourism, bird watching and arts and crafts festivals. The revenues from activities converging from agriculture are welcomed for the small farmers in subsistence agriculture from the coastal area.

MAL page: <https://h2020-coastal.eu/danube-mouths-black-sea>

TURISMUL RURAL IN ZONA COSTIERA - PROIECTII PENTRU VIITOR

La inceputul Lunii Septembrie 2019, In Cadrul Proiectului COASTAL, s-a desfasurat workshopul inter-sectorial pe tema identificarii sinergiilor existente in zona rural-costiera. Grupul de parteneri de discutii a inclus reprezentanți din turismul rural și de coastă, agricultură, acvacultură, pescuit și administrația locală. Discutiile au avut la baza rezultatele si concluziile workshopurilor sectoriale, și identificarea unor proiectii pentru viitor, a unor situatii ideale de dezvoltare durabila a zonei costiere intr-un orizont de timp de 5-30 de ani.

In ceea ce priveste activitatea turistica, s-a specificat faptul ca turismul din zona Deltei Dunării, în forma sa tradițională, va evolua către un sens mai larg, incluzând diverse activități conexe, cu un potential de crestere a numarului de vizitatori. Turismul alternativ poate crea o relație mai strânsă între vizitatori și comunitatea locală. Vizitatorii vor folosi sau vor împărtăși aceleasi servicii ca si localnicii, explorând mediul natural conservat, bucătăria autentică și tradițiile locale. Acest tip de turism este considerat un element cheie al dezvoltării durabile.

O direcție interesantă care a fost evidențiată este tranziția la agroturism cu includerea unor forme specifice: turismul gastronomic (delicii culinare, degustare de vinuri etc.), turism cultural sau de patrimoniu (datorită diversitatii etnice din zona), turism științific, observarea păsărilor, festivaluri de artă și meșteșuguri. Aceste forme de turism ar putea asigura venituri din activități convergente agriculturii, fiind binevenite pentru cei care practica agricultura de subzistență.

1.16. Practice Abstract 16

SCENARIO NARRATIVES - RURAL TOURISM IN TOPALU (ROMANIA)

The Romanian MAL included the participation of representatives of local authorities in the coastal area. The participants were asked for the description of a potential version of the future. Thus, it was described a visionary image of the case study area in a future where the various sectors work together to enhance sustainable land-sea synergies.

One of the most interesting visionary scenarios for the future development of the Romanian Coastal tourism described the projection of an integrated touristic village on the Danube's shores, in Topalu Village. The stakeholder vision is pointing towards more than just leisure and recreation, including a close interaction of travelers with the destination, for discovery of ancient stories of the region. Near Capidava Citadel, the local authorities organise a yearly art and music festival, aiming to establish a modern art museum in the area.

The future scenario includes the development of a miniport for cruise vessels, with electric vehicles charging facilities, and cycling paths that start from the miniport and cross the coastal region. The target is to set up sustainable tourism activities and split the village area into two converging zones: the traditional region (including Capidava Citadel) and the modern region. The scenario is centered on the visitor's freedom to choose on how to spend their own time, either in the music and art festivals, bird watching, gastronomic travelling or sightseeing.

Another idea is the implementation of a broader international collaboration project, donating land for an open-air museum, where countries from the Danube's Course could be represented by building traditional houses, to promote their own traditions and heritage.

MAL page: <https://h2020-coastal.eu/danube-mouths-black-sea>

TURISMUL RURAL IN LOCALITATEA TOPALU - PROECTII PENTRU VIITOR

Workshopul participatoriu inter-sectorial desfasurat in Constanta, cu privire la dezvoltarea armonioasa a zonei rural-costiere a inclus participarea reprezentanților autorităților locale din zona de interes a proiectului COASTAL.

Unul dintre cele mai interesante scenarii pentru dezvoltarea viitoare a turismului rural a descris proiecția unui sat de pe malul Dunarii, dotat cu tehnologii moderne, impletind traditionalul cu modernismul. Desfasurarea turismului in zona implica mai mult decat petrecerea timpului liber pentru repaus sau recreere in natura, presupunand o interacțiune strânsă a turistilor cu localnicii, incluzand chiar descoperirea poveștilor stravechi ale regiunii (prin punerea la dispozitie a unei monografii a localitatii). În apropiere de Cetatea Capidava, autoritățile locale organizează anual un festival de artă și muzică, cu scopul final de a crea un muzeu de artă modernă în zonă.

Planurile de dezvoltare pe termen lung includ construirea unui miniport pentru vase de croazieră, dotat cu statii de încărcare a vehiculelor electrice. De asemenea, se vor proiecta trasee pentru ciclism, care pornesc de la miniport și traversează regiunea de coastă. Obiectivul acestor planuri il reprezinta promovarea unui turism

armonios și prietenos cu mediul și de aceea se împarte regiunea în două zone distincte: regiunea tradițională (incluzând Cetatea Capidava) și regiunea modernă (cu tehnologii adaptate prezentului). Scenariul este centrat pe libertatea vizitatorului de a alege cum să-și petreacă propriul timp, fie la festivalurile de muzică și artă, vizionarea elementelor din natură, turismul gastronomic sau vizitarea obiectivelor turistice.

O altă idee este punerea în aplicare a unui proiect internațional de anvergura, prin construirea unui muzeu în aer liber, în care țările de pe Cursul Dunării ar putea fi reprezentate prin construirea unor case tradiționale, pentru promovarea propriilor tradiții și a moștenirii culturale.

1.17. Practice Abstract 17

SCENARIO NARRATIVES - DEVELOPMENT OF AGRICULTURE SECTOR IN THE COASTAL AREA OF ROMANIA

Multi- Actor workshop in Romania included participants involved in agricultural policy and strategy. The stakeholders commonly developed a vision of the future of our coastal area and draw up an ideal situation of the agriculture sector, having in mind the creation of beneficial coastal-rural synergies.

The agriculture vision on Romanian MAL, revealed key drivers for the envisioned future, building up a coherent storyline around the identified opportunities. First, the agriculture of the future should bring around an integrated production and the creation of value chains. Integrated production refers to modern farming systems that produce high-quality crops and food by sustainable use of biological resources, aiming to reduce pollution output. The value chains increase the competitive advantage through strategic partnerships of producers, processors, traders, logistics providers and retailers.

The long-term development of Romanian (Coastal) agriculture should follow the European model of association of farmers and food producers, creating agricultural cooperatives to be economically stronger.

The scientific and technological advances are key elements for sustainable agriculture, as well. Nutrients recovery and recirculation, pests and diseases resistant cultivars, precision farming are main topics foreseen in the long-term agricultural sector management plans for ensuring next generations food security and clean environment, under a changing climate.

For example, the fertility state of agricultural land should be properly assessed, taking into consideration that the wind and rain erosion of arable substrate reaches in Dobrogea region the maximum level from Romania.

MAL page: <https://h2020-coastal.eu/danube-mouths-black-sea>

DEZVOLTAREA SECTORULUI AGRICOL ÎN ZONA COSTIERA A ROMÂNIEI - PROIECTII PENTRU VIITOR

Workshopul multi-sectorial desfasurat in cadrul proiectului COASTAL a inclus participanți implicați în politica și strategia agricolă. Partenerii de dialog au elaborat un scenariu de dezvoltare ideală a sectorului agricol, având în vedere crearea unor sinergii benefice între zona costiera și cea rurala adiacenta acesteia, construind în jurul oportunităților identificate.

În primul rând, agricultura viitorului se va baza pe un management integrat și crearea de lanțurilor de valoare pentru obtinerea unui pordus integrat. Managementul integra se referă la sistemele agricole moderne care produc recolte și alimente de calitate crescuta print utilizarea durabilă a resurselor biologice, vizand in acelasi timp reducerea poluarii mediului. Lanțurile valorice cresc avantajul competitiv prin parteneriate strategice ale producătorilor, procesatorilor, comercianților, furnizorilor de logistică și comercianților.

Dezvoltarea pe termen lung a agriculturii românești (costiere) ar trebui să urmeze modelul european de asociere a fermierilor și producătorilor de produse alimentare, creând cooperative agricole pentru oferi stabilitate și forța economică membrilor asociați.

De asemenea, progresul științifice și tehnologice reprezintă elemente cheie pentru o agricultură durabilă. Recuperarea și recircularea substanțelor nutritive, cultivarea soiurilor rezistentă la boli și dăunători și agricultura de precizie sunt principalele subiecte prevăzute în planurile de management a sectorului agricol pe termen lung, pentru asigurarea securității alimentare și a unui mediului curat pentru generațiilor următoare, în condițiile actuale ale schimbărilor climatice.

De exemplu, starea de fertilitate a terenurilor agricole ar trebui să fie evaluată în mod corespunzător, luând în considerare faptul că eroziunea vântului și a ploii substratului arabil atinge în regiunea Dobrogea nivelul maxim din România.

1.18. Practice Abstract 18

DOMINANT CONTRIBUTIONS OF DIFFUSE SUBSURFACE LEGACY SOURCES TO NUTRIENT LOADS AND EUTROPHICATION OF COASTAL WATERS

Population growth and associated human activities, such as agriculture, have led to major nutrient and pollutant loads from land to coastal waters. Some of the past nutrient inputs from previous active sources at the land surface have accumulated in and remain as important diffuse legacy sources in the subsurface. A recent assessment of legacy source contributions from (different parts of) the Swedish Norrström catchment (MAL3 in the COASTAL project) shows that they may contribute around 70-80% of the total nutrient loading to the Baltic coastal waters. Such contributions may be in practice untreatable within the commonly short time frames given for compliance with environmental regulations. Consequently, due to dominant legacy sources, policies, regulations and international agreements implemented to mitigate nutrient loads to Baltic coastal waters have so far led to only small or no improvements. For considerable and relatively fast water quality improvements, mitigation measures need to be spatially directed to areas without major legacy sources. On longer time scales, good water quality can be achieved also in areas with major legacy sources, but only if new sources at the surface do not continue to feed into and maintain the legacy sources. An important research challenge, which will be further addressed in the COASTAL project for MAL3, is to identify where legacy sources are dominant, so that available resources for coastal eutrophication mitigation can be allocated to areas without such major legacies, where the measures will be most effective and can lead to relatively fast improvements of coastal water quality. MAL page: <https://h2020-coastal.eu/norrstrom-baltic>

Source: Destouni, G., and Jarsjö, J. (2018) Zones of untreatable water pollution call for better appreciation of mitigation limits and opportunities. Wiley Interdisciplinary Reviews: Water, 5(6), e1312. <https://onlinelibrary.wiley.com/doi/epdf/10.1002/wat2.1312>

VIKTIGA BIDRAG FRÅN DIFFUSA ÄRVDA KÄLLOR I MARKEN TILL NÄRSALTSBELASTNINGAR OCH ÖVERGÖDNING AV KUSTVATTEN

Befolkningstillväxt och relaterad mänsklig verksamhet, som jordbruk, har lett till stor belastning av närsalter och föroreningar från land till kustvatten. En del av närsalterna från tidigare aktiva källor på markytan har ansamlats och utgör nu viktiga diffusa ärvda källor i marken. En aktuell uppskattning av belastningsbidragen från sådana ärvda källor inom (olika delar av) det svenska Norrström-avrinningsområdet (MAL3 i COASTAL-projektet) har visat att de kan bidra med cirka 70-80% av den totala närsaltsbelastningen till Östersjöns kustvatten. Sådana belastningsbidrag kan i praktiken vara omöjliga att minska inom de vanligtvis korta tidsramar som ges för att följa miljöbestämmelser. Till följd av sådana stora belastningsbidrag från ärvda källor under markytan har genomförandet av politik, förordningar och internationella avtal för att minska närsaltsbelastningen till Östersjöns kustvatten hittills lett till endast små eller inga förbättringar. För att få betydande och relativt snabba förbättringar i vattenkvalitet måste åtgärder riktas till områden utan stora ärvda närslatskällor. Över längre tidsskalor kan god vattenkvalitet åstadkommas också i områden med stora ärvda källor, men endast om nya källor vid ytan inte fortsätter att föda in till och upprätthålla de ärvda källorna i marken. En viktig forskningsutmaning, som kommer att fortsättningsvis hanteras i COASTAL-projektet för MAL3, är att identifiera var ärvda källor är dominerande, så att tillgängliga resurser för minskning av kusternas övergödning kan riktas till områden utan sådana dominerande källor, där åtgärderna kommer att vara mest effektiva och kan leda till relativt snabba förbättringar av kustvattenkvaliteten.

Authors: Georgia Destouni (Stockholm University) and Samaneh Seifollahi-Aghmiuni (Stockholm University)

1.19. Practice Abstract 19

A SCENARIO SIMULATION APPROACH FOR IDENTIFYING EFFECTIVE LAND- AND/OR SEA-BASED MEASURES FOR COASTAL WATER QUALITY IMPROVEMENT

Coastal water quality and eutrophication may be affected by pollutant and nutrient loads from both land and the open sea, and by mixing of these within the coastal zone itself. Recent research has developed and tested a modelling approach that can consistently quantify and account for changes in coastal water quality and eutrophication due to various possible mitigation measures on land and/or in the sea. Such land-coast-sea interactions have been studied by specific application of this modelling approach to the COASTAL project's MAL3 case of the Baltic Sea and, as a local example, one of its coastal areas, the Archipelago Sea. The developed water quality model has been applied to and validated at the scale of the whole Baltic Sea, and consistently (with the open sea results as relevant boundary conditions) refined and adapted to the much smaller local-coast scale of the Archipelago Sea. For this Baltic coast, the model was used to investigate the effects on coastal water quality and eutrophication of different land- and/or sea-based nutrient management scenarios. The scenario simulation results show that successful sea-based measures may be most effective for coastal water quality improvement and eutrophication mitigation. This highlights the need to consistently account for change drivers and measures both on land and at sea when modelling and projecting coastal conditions and their possible improvements under future development scenarios. MAL page: <https://h2020-coastal.eu/norrstrom-baltic>

Source: Vigouroux, G., Destouni, G., Jönsson, A., and Cvetkovic, V. (2019) A scalable dynamic characterisation approach for water quality management in semi-enclosed seas and archipelagos. Marine Pollution Bulletin, 139, 311-327. <https://authors.elsevier.com/sd/article/S0025326X18308737>

EN METOD FÖR SCENARIO-SIMULERINGAR FÖR ATT IDENTIFIERA EFFEKTIVA LAND- OCH/ELLER HAVSBASERADE ÅTGÄRDER FÖR FÖRBÄTTRAD KUSTVATTENKVALITET

Vattenkvalitet och övergödning i kustområden kan påverkas av förorenings- och närsaltsbelastning från både land och det öppna havet, och av hur dessa blandas i själva kustzonen. Ny forskning har utvecklat och testat en modelleringsmetod för att konsekvent kvantifiera förändringar i kustzoners vattenkvalitet och övergödning på grund av olika möjliga åtgärder på land och/eller i havet. Sådana land-kust-hav-interaktioner har studerats genom specifik tillämpning av denna modellering på COASTAL-projektets MAL3, som omfattar Östersjön och, som ett kustzonsexempel, dess kustområde Skärgårdshavet. Den utvecklade modellen har tillämpats och validerats på skalan av hela Östersjön, och konsekvent (med resultaten för det öppna havet som relevanta randvillkor) i en förfinad och anpassad modell för Skärgårdshavets mycket mindre lokala kustskala. För detta lokala exempel användes modellen för att undersöka effekterna på kustens vattenkvalitet och övergödning av olika möjliga land- och/eller havsbaserade åtgärdsscenarioer. Resultaten från scenariosimuleringarna visar att havsbaserade åtgärder kan ha störst förbättringseffekter på kustzoners vattenkvalitet och övergödning. Detta belyser behovet av att konsekvent räkna med förändringsdrivkrafter och åtgärder både på land och i havet när man vill modellera och förutsäga kustförhållanden och deras möjliga förbättringar under olika framtida utvecklingsscenarioer.

Authors: Georgia Destouni (Stockholm University) and Samaneh Seifollahi-Aghmiuni (Stockholm University)

1.20. Practice Abstract 20

EFFECTIVENESS OF NATURE-BASED SOLUTIONS FOR CLIMATE ADAPTATION IN THE MEDITERRANEAN

Climate change is expected to have a significant impact on coastal ecosystem services affecting livelihoods and human well-being worldwide. The impacts are already severe in Mediterranean regions, such as the Mar Menor Region (<https://h2020-coastal.eu/mar-menor-coastal-lagoon>) and include increased flood frequency, droughts and soil erosion, and increased plant water stress affecting agricultural production. Adaptation strategies are needed to secure food production and freshwater availability for the growing global population and increase the resilience to floods, droughts, landslides and forest fires. There is a growing recognition that Nature-Based Solutions (NBS) can provide cost-effective and sustainable alternatives to hard engineering or grey infrastructures. NBS aim to manage environmental hazards and reduce the risks by 'building with nature'. Examples are Sustainable Land Management, Conservation Agriculture, Green Infrastructures, Community Based Adaptation, and Integrated River Basin Management.

Modelling and monitoring studies are needed to fit NBS to the local conditions. Especially important are studies combining on-site and off-site impacts, studies evaluating the effectiveness of NBS under past, present, and future climate conditions, and stakeholder-based modelling.

EFFECTIVIDAD DE LAS SOLUCIONES BASADAS EN LA NATURALEZA PARA LA ADAPTACIÓN CLIMÁTICA EN EL MEDITERRÁNEO

Se espera que el cambio climático tenga un impacto significativo en los servicios de los ecosistemas costeros que afectan los medios de vida y el bienestar humano en todo el mundo. Los impactos ya son graves en las regiones mediterráneas, como la región del Mar Menor (<https://h2020-coastal.eu/mar-menor-coastal-lagoon>) e incluyen una mayor frecuencia de inundaciones, sequías y erosión del suelo, y un mayor estrés hídrico en las plantas, que afecta la producción agrícola. Se necesitan estrategias de adaptación para asegurar la producción de alimentos y la disponibilidad de agua dulce para la creciente población mundial y aumentar la resistencia a las inundaciones, las sequías, los deslizamientos de tierra y los incendios forestales. Hay un reconocimiento creciente de que Las Soluciones Basadas en la Naturaleza (NBS) pueden proporcionar alternativas rentables y sostenibles a las obras de ingeniería o a las infraestructuras grises. El objetivo de las NBS es gestionar los peligros ambientales y reducir los riesgos mediante la "construcción con la naturaleza". Algunos ejemplos son la gestión sostenible de la tierra, la agricultura de conservación, las infraestructuras verdes, la adaptación basada en la comunidad y la gestión integrada de cuencas fluviales.

Se necesitan estudios de modelado y monitoreo para ajustar las NBS a las condiciones locales. Son especialmente importantes los estudios que combinan los impactos in situ y ex situ, los estudios que evalúan la efectividad de las NBS en condiciones climáticas pasadas, presentes y futuras, y la modelización participativa.

1.21. Practice Abstract 21

CONNECTING RESEARCH INFRASTRUCTURES WITH SECTORAL NETWORKS TO SUPPORT INTEGRATED MANAGEMENT OF MEDITERRANEAN COASTAL AND RURAL AREAS

Many Mediterranean coastal areas encounter similar problems in relation to governance and the implementation of sustainable management strategies. The lack of coordination between management of inland and coastal areas, and integration of land-sea data and knowledge exchange impede the transition towards sustainable development and coastal-rural synergies (<https://h2020-coastal.eu/>).

The main challenges to reach sustainable development of coastal-rural areas are data availability, knowledge exchange and effective governance. These could be tackled by coupling regional and international Research Infrastructures (RIs) with scientific and stakeholder collaboration networks to facilitate the co-creation of solutions.

In a recent study, two Horizon 2020 project teams (COASTAL and COOP+), joined forces to identify the main challenges in the sustainable development of coastal-rural areas followed by a review of major existing RIs, scientific knowledge and collaboration networks that can help support integrated management of Mediterranean coastal zones. A useful overview is given on the existing RIs, scientific and stakeholder collaboration platforms, together with recommendations for improved science-policy exchanges and strategies for sustainable development of coastal and rural areas.

The most important recommendations are: (1) the creation of local science-stakeholder networks to facilitate periodical meetings between all sectors involved and to connect science and policy actors and (2) setting up local RIs that support the data processing and interaction with regional and international RIs.

CONECTANDO INFRAESTRUCTURAS DE DATOS CON REDES DE INVESTIGACIÓN Y SECTORIALES PARA APOYAR LA GESTIÓN INTEGRADA DE LAS ZONAS COSTERAS Y RURALES DEL MEDITERRÁNEO

Muchas áreas costeras mediterráneas encuentran problemas similares en relación con la gobernanza y la implementación de estrategias de gestión sostenible. La falta de coordinación entre la gestión de las zonas costeras y del interior, la falta de integración de los datos tierra-mar y del intercambio de conocimientos impiden la transición hacia un desarrollo sostenible y las sinergias costeras-rurales (<https://h2020-coastal.eu/>).

Los principales desafíos para alcanzar el desarrollo sostenible de las zonas costeras rurales son la disponibilidad de datos, el intercambio de conocimientos y la gobernanza efectiva. Esto podría abordarse conectando Infraestructuras de Datos (ID) regionales e internacionales con redes de colaboración científica y sectoriales para facilitar la creación conjunta de soluciones.

En un estudio reciente, dos equipos del proyecto Horizon 2020 (COASTAL y COOP+) han unido fuerzas para identificar los principales desafíos en el desarrollo sostenible de las zonas costeras y rurales, seguido de una revisión de las principales ID existentes, redes de conocimiento científico y redes de colaboración sectorial que pueden ayudar a apoyar la gestión integrada de las zonas costeras mediterráneas. El estudio ofrece también recomendaciones para mejorar los intercambios entre ciencia y sociedad y promover estrategias para el desarrollo sostenible de las zonas costeras y rurales.

Las recomendaciones más importantes son: (1) la creación de redes locales para facilitar reuniones periódicas entre todos los sectores involucrados y conectar a los actores sectoriales, científicos y de las administraciones

públicas, así como (2) establecer ID locales que apoyen el procesamiento de datos y la interacción con ID internacionales.

1.22. Practice Abstract 22

ISSUES AND BUSINESS OPPORTUNITIES IN COASTAL-RURAL AREAS IN THE CONTEXT OF LAND-SEA SYNERGIES & COASTAL RURAL COLLABORATION

During the local stakeholders' sectoral workshops, common issues as well as business opportunities faced by the European coastal-rural areas, were identified. These issues were mostly linked to anthropogenic pressures on the environment: water pollution and eutrophication; water scarcity; soil pollution and salinization; biodiversity loss; inland, beach and marine litters, beach erosion and flood risks; which will most likely be enhanced by sea-level rise and other climate change consequences. Other issues were related to the clustering of multiple activities (stakeholders' conflicts; lack of cooperation between sectors), the insufficiency of information and education for the development of local activities in a sustainable manner as well as for the general public (increasing environmental awareness, need of change of lifestyle). Additionally, many regions encounter difficulties in applying the principal of sustainable growth. European coastal-rural areas not only face issues related to nature and cultural conservation, but also in managing (or lack of management) natural protected areas. The high-density level of coastal areas coupled with the touristic attractiveness of these areas also leads to traffic congestion and transport network issues, land use pressure (increase land price, decrease of land availability), and high seasonal population variability. However, besides facing many issues, coastal-rural areas offer many business opportunities in the sector of renewable energy, risk management, and alternative forms of tourism (eco-tourism, agro-tourism). Innovative business practices related to water management and waste management (e.g. the use of nature-based solutions), in the agricultural and fisheries sectors (cross-sectoral collaboration) can also foster land-sea synergies while creating sustainable growth.

It is worth noticing that practices with the main purpose of improving coastal-rural collaborations and land-sea synergies are not yet commons. In fact, the sector workshops of the COASTAL project are one of the first attempts to identify the opportunities for land-sea synergy and added value for regional development.

Authors: Ebum Akinsete, Phoebe Koundouri, Alice Guittard

1.23. Practice Abstract 23

NATURE-BASED SOLUTIONS FOR ENVIRONMENTAL ISSUES IN COASTAL AREAS

In the context of foster land-sea synergies & coastal-rural collaborations, business innovations based on nature-based solution offer sustainable solutions to anthropogenic pressures and can also offer additional benefits in terms of landscape restoration, providing new opportunities in terms of recreational activities. In coastal-rural areas it can create the base for a circular economy system through water recycling and reuse. For instance, as an alternative to coastal discharges, areas with extensive wetlands could possibly be part of a secondary treatment/overland flow system, with the already nutrient rich wetlands ‘treating’ the final effluent material. Also, instead of being expensively treated and ejected into the system, wastewater could be reused, particularly by the agricultural sector or by coastal golf courses. A well-designed and planned water recycling and reuse system with nature-based solutions over the whole coastal-inland system (that includes stakeholders from coastal and rural areas in the design process), would reduce the impact of inland polluted water onto the coastal-sea ecosystems; and by extension the impact on activities such as fishery, aquaculture and coastal tourism, which are dependent on good sea-water quality.

Nature-based solutions are also used in coastal risk management (coastal erosion, waves surges), sand beach nourishment can be used as alternative solutions to conventional options to reduce coastal erosion with an additional co-benefits through increased attractiveness of recreational opportunities by increasing the beach width (i.e. development of new water sports activities, construction of new beach houses), and consequently the number of tourists. It also improves the environmental quality of the area with positive impact on the local biodiversity. Such co-benefits can increase economic activity, generating tax revenues, which in turn lead to leveraging of the overall public investments in the project.

Authors: Ebun Akinsete, Phoebe Koundouri, Alice Guittard

1.24. Practice Abstract 24

A DURABLE NETWORK FOR KNOWLEDGE EXCHANGE AND BLUE GROWTH

The creation of a durable platform for knowledge exchange is a key objective of the H2020 project COASTAL (h2020-coastal.eu). The Belgian Coastal zone has a densely populated coastline. Next to an aging population in the coastal cities, also younger people are forced to work outside the coastal cities and move due to staggering real estate price development. In addition, the coastal “brain drain” is a growing concern. The coastal zone does not offer jobs for the higher educated people and employment is primarily seasonal and aimed at tourism and recreation. Blue Growth is currently considered as the main social-economic opportunity for the Belgian coastal zone. Yet, the current initiatives aimed at blue growth are still fragmented. An active community comprising stakeholders in this sector, ranging from knowledge institutions, government institutions and private companies has been formed in the region. Partners join on an ad hoc basis for projects and meetings and the Flemish Government created a new spearhead cluster for Blue Growth (<https://www.blauwecluster.be/about-us>). Collaboration is often limited to the context of specific projects or grant applications. Optimizing cooperation and communication between stakeholders would create unique opportunities to fine-tune the expertise within the blue sector, identify synergies, and develop a durable network for collaboration. Recently, a couple of actors joined forces and the "Ostend Science Park" was established on the GreenBridge site (www.greenbridge.be). The science park has the central objective of bringing marine and coastal knowledge partners, and blue industries businesses Together. In the long term, the aim is to develop a durable platform for knowledge exchange and co-creation of innovative solutions to address the challenges of tomorrow. The COASTAL project and Belgian Multi-Actor Lab are an excellent basis for extending the platform to rural operators.

EEN DUURZAAM NETWERK VOOR KENNISUITWISSELING EN BLAUWE GROEI

Het creëren van een duurzaam platform voor kennisuitwisseling is een belangrijke doelstelling van het H2020-project COASTAL (h2020-coastal.eu). De Belgische Kustzone heeft een dichtbevolkte kustlijn. Naast een vergrijzende bevolking in de kuststeden worden ook jongeren gedwongen om buiten de kuststeden te werken en te verhuizen als gevolg van de duizelingwekkende vastgoedprijsontwikkeling. Daarnaast is de "braindrain" aan de kust een groeiende zorg. De kustzone biedt geen banen voor hoger opgeleiden en de werkgelegenheid is vooral seizoensgebonden en gericht op toerisme en recreatie. Blauwe groei wordt momenteel beschouwd als de belangrijkste sociaal-economische kans voor de Belgische kustzone. Toch zijn de huidige initiatieven gericht op blauwe groei nog steeds versnipperd. In de regio is een actieve gemeenschap van belanghebbenden in deze sector, variërend van kennisinstellingen, overheidsinstellingen en privé-bedrijven, gevormd. Partners sluiten zich ad hoc aan voor projecten en vergaderingen en de Vlaamse Regering creëerde een nieuwe speerpuntcluster voor Blauwe Groei (<https://www.blauwecluster.be/about-us>). De samenwerking beperkt zich vaak tot de context van specifieke projecten of subsidieaanvragen. Het optimaliseren van de samenwerking en communicatie tussen stakeholders zou unieke mogelijkheden creëren om de expertise binnen de blauwe sector te verfijnen, synergieën te identificeren en een duurzaam samenwerkingsnetwerk te ontwikkelen. Onlangs hebben een aantal actoren hun krachten gebundeld en werd op de GreenBridge site (www.greenbridge.be) het "Oostende Science Park" opgericht. Het wetenschapspark heeft als centrale doelstelling om mariene en kustkennispartners en bedrijven uit de blauwe industrie samen te brengen. Op lange termijn is het doel om een duurzaam platform te ontwikkelen voor kennisuitwisseling en co-creatie van innovatieve oplossingen om de uitdagingen van morgen aan te gaan. Het COASTAL-project en het Belgische Multi-Actor Lab vormen een uitstekende basis om het platform uit te breiden naar landelijke operatoren.

1.25. Practice Abstract 25

RENEWABLE ENERGY RESOURCES - POTENTIAL FOR ECONOMIC GROWTH IN THE DANUBE DELTA

Romania has an important potential of renewable energy sources, such as geothermal, biomass, hydro, wind and solar power. Dobrogea region has the highest wind energy potential and is considered as a fast-growing market for wind energy in the South-Eastern Europe, with an installed capacity of approximately. 2000 MW (8% of total country) in 2018. In the same time, biomass production is an economic sector under exponential development. Agriculture is a significant contributor to the biomass supply in the form of energy crops, by-products and waste materials. Investments in renewable energy can contribute to sustainable economic development of rural area of the Danube Delta region by opening new business opportunities, increasing the endowment level, new sources of income for farmers and for local public administration leading to the improvement of the existing infrastructure and increasing the competitiveness of the area. The specialty literature already demonstrated that an increased share of renewable energy consumption leads to improvement of the quality of economic growth. Environmental sustainability brings along the wide social acceptance of renewable sources of energy as a reflection of human wellbeing indicators. In the future, the role of renewable energy production and use will enhance the economic, financial and social wellbeing of the Danube Delta region by creating jobs, diversification of population income, environmental safeguarding and overall improvement of life quality.

SURSE REGENERABILE DE ENERGIE - POTENTIAL DE CRESTERE ECONOMICA IN DELTA DUNARII

Romania are un potențial imens de surse de energie regenerabilă, precum biomasă, energie geotermala, hidroenergie, energie eoliană și energie solară. Regiunea Dobrogea are cel mai mare potențial de energie eoliană, și este considerată o piață în creștere rapidă a energiei eoliene în sud-estul Europei, cu o capacitate instalată de aproape 2000 MW (8% din capacitatea națională) în 2018. De asemenea, producția de biomasă este un sector economic aflat în dezvoltare exponențială. Sectorul agricol din zona Deltei Dunării poate contribui la aprovizionarea cu biomasă sub forma de culturi energetice, produse secundare și materiale reziduale. Investițiile în producerea de energie regenerabilă pot contribui la dezvoltarea economică durabilă a zonei rurale din regiunea Deltei Dunării prin deschiderea unor noi oportunități de afaceri, creșterea nivelului de dotare în zonele rurale, noi surse de venituri pentru fermieri și pentru administrația publică locală ducând la îmbunătățirea infrastructurii existente și a creșterii competitivității zonei. Literatura de specialitate a arătat deja că o pondere crescută a consumului de energie regenerabilă duce la îmbunătățirea calității creșterii economice. Activitățile prietenoase cu mediul înconjurător conduc la o acceptare socială imediată a surselor regenerabile de energie ca o reflectare a indicatorilor bunăstării umane. În viitor, rolul producției și utilizării de energie regenerabilă va spori bunăstarea economică, financiară și socială a regiunii Delta Dunării prin crearea de locuri de muncă, diversificarea veniturilor populației, protecția mediului și îmbunătățirea calității vieții locuitorilor din zona.

1.26. Practice Abstract 26

ORGANIC FARMING – PILLAR FOR SUSTAINABLE DEVELOPMENT OF THE BUSINESS ECOSYSTEM IN DANUBE DELTA REGION

Although organic farming represents a niche segment in terms of both acreage and production in Romania, it is gaining increased attention due to its sustainable principles of ecological importance and the economic opportunities it can offer. About 10% of the arable area of Tulcea County is represented by organic farming, ranking Tulcea on the first place in the country in this domain. Organic farming in the Danube Delta region can be considered a model of sustainable development, transforming the potential disadvantages resulting from restrictions due to the vicinity of the protected areas, in advantages for creating value added products, respecting nature. Organic farming is beneficial for the development of the rural area of the Danube Delta region through its role in promoting alternative food chains, capitalizing on the existing natural resources and the positive impact on the environment. This will contribute to the expansion of high value-added economic activities and job creation. The region presents favourable conditions for the production of organic bee products, with a very good honey base (sunflower, lime, spontaneous flora). More than 350 producers have been registered as certified suppliers of organic products in Tulcea County, which is at the highest level throughout the country. According to statistical data, the total consumption of organic products has been steadily increasing during the last ten years so that the development of a business in this field can bring real success. Moreover, the introduction into the agroecotouristic circuit of businesses based on organic production could be a development direction.

AGRICULTURA ECOLOGICA - PILON DE SUSTINERE A DEZVOLTARII DURABILE PENTRU ECOSISTEMUL DE AFACERI IN REGIUNEA DELTEI DUNARII

Deși, în România, agricultura ecologică reprezintă un segment de nișă atât în ceea ce privește suprafața cât și producția, aceasta câștigă o atenție sporită datorită principiilor sale durabile de importanță ecologică și oportunităților economice pe care le poate oferi. Aproximativ 10% din suprafața arabilă a județului Tulcea este reprezentată de agricultura ecologică, clasând județul pe primul loc în țară în acest domeniu. Agricultura ecologică din regiunea Deltei Dunării poate fi considerată un model de dezvoltare durabilă, transformând potențialele dezavantaje rezultate din restricții datorate vecinătății ariilor protejate, în avantaje pentru crearea de produse cu valoare adăugată, respectând natura. Agricultura ecologică este benefică pentru dezvoltarea spațiului rural din regiunea Deltei Dunării prin rolul său în promovarea lanțurilor alimentare alternative, valorificarea resurselor naturale existente și impactul pozitiv asupra mediului. Aceasta va contribui la extinderea activităților economice cu valoare adăugată mare și la generarea de locuri de muncă. Regiunea prezintă condiții propice pentru realizarea produselor apicole ecologice, existând o bază melifera foarte bună (floarea soarelui, tei, flora spontană). Un număr de peste 350 de producători au fost înregistrați ca furnizori certificați de produse ecologice în județul Tulcea, acesta fiind la nivel superior pe întreaga țară. Conform datelor statistice, consumul total de produse ecologice este în continuă creștere în ultimii zece ani astfel ca dezvoltarea unei afaceri în acest domeniu poate aduce un succes real. Mai mult, introducerea în circuitul agroecoturistic al unor afaceri bazate pe producția ecologică ar putea fi o direcție de dezvoltare.

1.27. Practice Abstract 27

NEW IRRIGATION TECHNOLOGIES - PRACTICAL SOLUTIONS FOR THE DANUBE DELTA REGION

Given that irrigation accounts for 70% of total water consumption worldwide, investments in modern irrigation systems to optimize water consumption and avoid waste are of immediate importance in the Danube Delta region. In 2018, Tulcea County represented almost 14% of the irrigated area of Romania. The optimum irrigation method depends on soil type, crop type and irrigation surface. Currently, there are developed irrigation technologies that reduce the energy costs compared to the systems of pushing water from the Danube to the shore. Depending on the type of culture and cultivation technology applied, in the Danube Delta Region all four basic methods of irrigation can be applied, namely: surface irrigation, underground irrigation, sprinkling, and micro-irrigation. For cultivation in an ecological system the most suitable is drip irrigation. For large surfaces sprinkler is recommended. The digitization of the irrigation activity can make the difference between profit and loss in the activity of the farms, by monitoring the timing, the humidity and the quantity of water needed. The incorporation of wireless sensors that measure the humidity in the air, the temperature and the humidity of the soil will lead to the real-time data collection, obtaining greater efficiency of water use. The use of remote sensing for irrigation management will provide the advantage of systematic measurements in space and time, the ability to cover large areas and the ability to be integrated into models, and with GIS systems. New irrigation technologies use algorithms to obtain vegetation indices from satellite images in combination with ground measurements to estimate large surface evapotranspiration.

NOI TEHNOLOGII DE IRIGATII – SOLUTII PRACTICE PENTRU REGIUNEA DELTEI DUNARII

Avand in vedere faptul ca irigarea reprezintă 70% din consumul total de apă la nivel mondial, investitiile in sisteme moderne de irigatii pentru optimizarea consumului de apa si evitarea risipei sunt oportune in regiunea Deltei Dunarii. In 2018, Judetul Tulcea reprezenta aproape 14% din suprafata irigata a Romaniei. Alegerea metodei potrivite de irigare depinde de tipul de sol, tipul de cultura si suprafata de irigat. In prezent, exista tehnologii performante de irigat care reduc costurile energiei comparativ cu sistemele de urcare a apei dinspre Dunăre spre mal. In functie de tipul de cultura si tehnologia de cultivare aplicata, in Regiunea Deltei Dunarii pot fi aplicate toate cele patru metode de baza ale irigării, si anume: scurgerea la suprafață, irigația subterană, aspersiunea, și micro-irigarea. Pentru cultivarea in sistem ecologic, cea mai potrivita este irigarea prin picurare. Pentru suprafetele mari se recomanda aspersiunea. Digitalizarea activitatii de irigare, poate face diferenta intre profit si pierdere in activitatea fermelor, prin monitorizarea temporizarii, a umiditatii si a cantitatii de apa necesare. Incorporarea senzorilor wireless care măsoară umiditatea in aer, temperatura și umiditatea solului va conduce la colectarea in timp real a datelor, obtinand eficiență mai mare a utilizării apei. Utilizarea teledetectiei pentru gestionarea irigării va oferi avantajul unor măsurători sistematice în spațiu și timp, capacitatea de a acoperi suprafețe mari și capacitatea de a fi integrate în modele, și cu sisteme GIS. Mai nou, exista metode care folosesc algoritmi pentru a obține indici de vegetație din imagini prin satelit în combinație cu măsurători la sol pentru a estima evapotranspirația pe suprafețe mari.

1.28. Practice Abstract 28

HYDRO-CLIMATIC EFFECTS ON BALTIC COASTAL AND MARINE CONDITIONS

This research has developed a quantification methodology and used it to assess the impacts of climate and hydrology on coastal conditions in the Baltic MAL3 case of the COASTAL project. Specifically, the study has assessed impacts on seawater temperature, salinity and flow structure (magnitudes and directions of flows between different marine basins and associated coastal zones) of the freshwater runoff from land, the saltwater influx from the North Sea, and the wind and net surface heat flux (related to air temperature) conditions over the sea. The investigated resulting conditions of seawater temperature, salinity and flow structure are fundamental for the water quality, eutrophication and ecosystem status of the Baltic Sea and its coastal waters. The exploration of hydro-climatic impacts on these conditions has shown that: (i) The net heat flux is a main control of sea water temperature; (ii) The freshwater runoff from land, which was also found to be well correlated with the salt water influx from the North Sea, controls average sea salinity; (iii) The wind conditions control water flow magnitudes, while the flow directions remain relatively stable. These findings identify main driver-effect relationships that can guide choices of best climate models to use in projections of the coastal effects of future hydro-climatic scenarios, based on the most relevant climate-model outputs for key physical Baltic coast conditions.

Authors: Georgia Destouni (Stockholm University) and Samaneh Seifollahi-Aghmiuni (Stockholm University)

*Source: Chen, Y., Vigouroux, G., Bring, A., Cvetkovic, V., Destouni, G. (2019) **Dominant hydro-climatic drivers of water temperature, salinity, and flow variability for the large-scale system of the Baltic coastal wetlands.** Water (MDPI), 11, 552. <https://www.mdpi.com/2073-4441/11/3/552>*

HYDRO-KLIMATEFFEKTER PÅ ÖSTERSJÖNS KUST- OCH MARINA FÖRHÅLLANDEN

Denna forskning har utvecklat en metodik och använt den för att undersöka effekterna av klimat och hydrologi på Östersjöns kustförhållanden, som utgör MAL3 inom COASTAL-projektet. Specifikt har studien visat påverkan på havsvattnets temperatur, salthalt och flödesstruktur (storlek och riktning av flöden mellan olika marina bassänger och tillhörande kustzoner) av sötvattenavrinningen från land, saltvatteninflödet från Nordsjön, samt vindförhållandena och nettovärmeflödet (relaterat till lufttemperatur) över havet. De undersökta resulterande förhållandena i termer av vattentemperatur, salthalt och flödesstruktur är grundläggande för vattenkvalitet, eutrofiering och ekosystemstatus i Östersjön och dess kustvatten. Forskningen om hydro-klimatets påverkan på dessa förhållanden har visat att: (i) Nettovärmeflödet styr havsvattentemperaturen; (ii) Sötvattenavrinningen från land, som också visade sig vara korrelerad med saltvatteninflödet från Nordsjön, styr den genomsnittliga salthalten i havet; (iii) Vindförhållandena styr havsvattenflödenas storlek, medan flödesriktningarna förblir ganska stabila. Dessa resultat identifierar dominerande orsak-verkan-samband, som kan vägleda val av bästa klimatmodeller att använda i prognoser av framtida hydro-klimat effekter på viktiga kustförhållanden i Östersjön.

1.29. Practice Abstract 29

LAND-COAST-SEA INTERACTIONS AND IMPACTS ON SEAWATER QUALITY

For the Baltic MAL3 case of COASTAL, a numerical simulation method has been used for controlled experimentation on the concentration patterns that various solute (nutrient, pollutant) releases from land lead to in different Baltic coasts and the open sea. The Swedish Kalmar County coast and the Polish coast of the Vistula River outlet are two Baltic coast examples investigated with this method. Equivalent solute releases from these two coasts lead to different local coastal concentrations but similar overall concentration patterns in the open Baltic Sea. For solute release scenarios that are proportional to the actual nutrient loads from land in these cases, the highly-populated Vistula catchment yields much greater total, but smaller per-capita nutrient impacts than the Kalmar County catchment in the open Baltic Sea. For the open sea concentration contributions to be as low per capita as from those from the Vistula catchment, the per-capita nutrient loading from Kalmar County would have to be reduced much more than required on average per Swedish inhabitant by the Baltic Sea Action Plan. This highlights an unfairness issue in the per-capita distribution of nutrient load allowance among the Baltic countries, which needs to be considered and handled in further research and international efforts aimed to combat the Baltic Sea eutrophication.

Authors: Georgia Destouni (Stockholm University) and Samaneh Seifollahi-Aghmiuni (Stockholm University)

Source: Chen, Y., Cvetkovic, V., Destouni, G. (2019) Scenarios of Nutrient-Related Solute Loading and Transport Fate from Different Land Catchments and Coasts into the Baltic Sea, Water, 11, 1407. <https://doi.org/10.3390/w11071407>

LAND-KUST-HAVSINTERAKTIONER OCH EFFEKTER PÅ HAVSVATTENKVALITET

En numerisk simuleringsmetod har använts för kontrollerad experimentering på de koncentrationsmönster som olika ämnesutsläpp (av näringsämnen, föroreningar) från land leder till i olika kustzoner och i öppna havet för Östersjö-fallet MAL3 i COASTAL. Den svenska kusten vid Kalmar län och den polska kusten vid Vistula-flodens utlopp är två exempelkuster som har undersökts med denna metod. Liknande ämnesutsläpp från dessa två kuster leder till olika lokala kustkoncentrationer, men liknande övergripande koncentrationsmönster i det öppna havet. För scenarier av ämnesutsläpp som är proportionella till de faktiska belastningarna av näringsämnen från land blir koncentrationseffekterna i öppna havet mycket större totalt, men mindre per person från Vistulas avrinningsområde (med stor befolkning) än från Kalmar läns avrinningsområde (med mycket mindre befolkning). För att resulterande koncentrationseffekter i havet ska vara lika låga per person från Vistulas avrinningsområde, måste belastningen av näringsämnen per person från Kalmar län minskas mycket mer än vad som krävs i genomsnitt per svensk invånare i den internationella överenskommelsen Baltic Sea Action Plan. Detta belyser en orättvis fördelning av reduktionskrav mellan de baltiska länderna, som måste beaktas och hanteras i ytterligare forskning och internationella ansträngningar för att bekämpa Östersjöns övergödning.

1.30. Practice Abstract 30

STAKEHOLDER PERSPECTIVES ON BALTIC LAND-COAST-SEA INTERACTIONS

Coastal regions are subject to multiple change pressures from human activities and climate change on land and at sea. These pressures also relate to other societal and ecosystem risks, e.g., for water, food and energy security, human, animal and ecosystem health, and climate change adaptation. Local and regional actors in the Swedish Norrström catchment (MAL3 in the COASTAL project) were invited to a series of sector workshops to collaboratively identify key physical, socio-economic and environmental components of the land-coast-sea system in MAL3, and to discuss opportunities and barriers for coastal sustainability. The discussions in these workshops have resulted in mind maps of interlinked land-coast-sea processes and related human activities and sectors. These mind maps show a general stakeholder perception of high complexity in the interactions and feedback structures of the MAL3 coastal system. Furthermore, the discussions on relevant policies and management structures for sustainable coastal, rural and urban development have highlighted policy and implementation fragmentation as main concerns and barriers for cross-sectoral collaborations in this system.

Authors: Georgia Destouni (Stockholm University) and Samaneh Seifollahi-Aghmiuni (Stockholm University)

Source: Seifollahi-Aghmiuni, S., Kalantari, Z., Prieto, C., Chen, Y., and Destouni, G. (2019) Stakeholder perspectives on sustainable coastal development: A Baltic coast case study. Baltic Sea Science Congress, 19-23 August, Stockholm, Sweden.

AKTÖRSPERSPEKTIV PÅ LAND-KUST-HAVSINTERAKTIONER I ÖSTERSJÖN

Kustregioner är utsatta för olika förändringstryck från mänskliga aktiviteter och klimatförändringar på land och i havet. Dessa tryck är också relaterade till andra samhälls- och ekosystemrisker, t.ex. för vatten-, mat- och energisäkerhet, människors, djurs och ekosystems hälsa, anpassning till klimatförändringar. Lokala och regionala aktörer i Norrströms avrinningsområde (MAL3 i COASTAL-projektet) bjöds in till en serie möten för att sektorsvis identifiera viktiga fysiska, socioekonomiska och miljömässiga aspekter i MAL3-fallets land-kust-havssystem och diskutera möjligheter och hinder för att uppnå hållbarhet i detta system. Mötesdiskussionerna har resulterat i tankekartor över sammanlänkade land-, kust- och havsprocesser och relaterade mänskliga aktiviteter och sektorer. Dessa tankekartor visar en allmän uppfattning av hög komplexitet i MAL3-kustsystemets interaktioner och återkopplingar. Vidare har diskussionerna om relevant politik och förvaltning för hållbar kust-, landsbygds- och stadsutveckling framhävt politik- och förvaltningsfragmentering som huvudsakliga problem och hinder för tvärsektorielt samarbete i detta system.

1.31. Practice Abstract 31

THE EVOLUTION OF GIALOVA LAGOON WETLAND OVER THE LAST 70 YEARS.

Human interventions during the last 70 years have altered the characteristics of the Gialova Lagoon, a coastal wetland that is part of a wider Natura 2000 site. Results, based on a combination of conceptual hydrologic models, analysis of aerial photographs, interviews with local elderly, field observations, and GIS (Geographic Information System) analyses, revealed that the combined effects of human interventions and climate have led to decreased wetland size and increased salinity in the wetland over time. The fresh and brackish water marshes have gradually been turned into open water (open water coverage in the whole wetland has increased by almost 23%) or replaced by halophytic vegetation with implication on the ecology of the wetland. Parts of the wetland have been transformed to agricultural land (increased by 44.5%) and vegetation coverage has been decreased by almost 47% resulting to less habitats for birds, amphibians and reptiles. Current human activities inside the Natura 2000 area and in the surrounding areas could further impact on the water quantity and quality in the wetland, and on its sensitive ecosystems. A more holistic understanding of the broader socio-ecological system is needed to understand the dynamics of the wetland and to achieve sustainable long-term management and conservation strategies, and the work under COASTAL provides the platform for such an approach.

Author: Giorgos Maneas (Stockholm University), based on: Maneas, G., Makopoulou, E., Bousbouras, D., Berg, H., Manzoni, S. (2019) Anthropogenic Changes in a Mediterranean Coastal Wetland during the Last Century—The Case of Gialova Lagoon, Messinia, Greece. Water, 11(2), 350. <https://doi.org/10.3390/w11020350>

Η ΕΞΕΛΙΞΗ ΤΟΥ GIALOVA LAGOON WETLAND ΣΤΑ ΤΕΛΕΥΤΑΙΑ 70 ΧΡΟΝΙΑ.

Τα χαρακτηριστικά της Λιμνοθάλασσας Γιάλοβα, ενός παράκτιου υγροτόπου που αποτελεί μέρος μιας ευρύτερης περιοχής Natura 2000, έχουν αλλοιωθεί από τις ανθρωπογενείς δραστηριότητες τα τελευταία 70 χρόνια. Τα αποτελέσματα, βασισμένα σε συνδυασμό εννοιολογικών υδρολογικών μοντέλων, ανάλυση αεροφωτογραφιών, συνεντεύξεις με ηλικιωμένους της περιοχής, παρατηρήσεις πεδίου και αναλύσεις Γεωγραφικού Συστήματος Πληροφοριών (GIS), αποκαλύπτουν ότι με την πάροδο του χρόνου οι ανθρώπινες παρεμβάσεις σε συνδυασμό με τις επικρατούσες κλιματικές συνθήκες οδήγησαν σε μείωση του μεγέθους του υγροτόπου καθώς και σε αυξημένες τιμές αλατότητας. Υγροτοπικές εκτάσεις καλυπτόμενες με βλάστηση γλυκού ή/και υφάλμυρου νερού, έχουν σταδιακά μετατραπεί σε εκτάσεις καλυπτόμενες από νερό μόνο (η επιφάνεια του νερού σε ολόκληρο τον υγρότοπο έχει αυξηθεί κατά σχεδόν 23%) ή έχουν αντικατασταθεί από αλοφυτική βλάστηση με επιπτώσεις στην οικολογία του υγροτόπου. Μέρη του υγροτόπου έχουν μετατραπεί σε καλλιεργήσιμη γη (αυξημένη κατά 44,5%), ενώ η βλάστηση συνολικά έχει μειωθεί σχεδόν κατά 47%, περιορίζοντας τα ενδιαίτηματα για πτηνά, αμφίβια και ερπετά. Οι τρέχουσες ανθρώπινες δραστηριότητες, εντός και πέριξ της περιοχής Natura 2000, επηρεάζουν περαιτέρω την ποσότητα και την ποιότητα των υδάτων με επιπτώσεις στον υγρότοπο και στα ευαίσθητα οικοσυστήματά του. Για την κατανόηση της δυναμικής του υγροτόπου και την επίτευξη βιώσιμων μακροπρόθεσμων στρατηγικών διαχείρισης και διατήρησης, απαιτείται μια πιο ολιστική προσέγγιση του ευρύτερου κοινωνικοοικονομικού συστήματος, προσέγγιση που επιχειρείται στο πλαίσιο του προγράμματος COASTAL.

1.32. Practice Abstract 32

THE HYDROLOGY OF GIALOVA LAGOON WETLAND AND RESTORATION NEEDS.

Coastal wetlands and lagoons are under pressure due to competing demands for freshwater resources and climatic changes. To manage such wetlands and maximize their provision of ecosystem services, their hydrologic balance must be quantified. In the Gialova Lagoon wetland (SW Messinia, Greece), water exchanges were dominated by evaporation and saline water inputs from the sea during the summer, while precipitation and freshwater inputs were more important during the winter. About 40 % and 60 % of the freshwater inputs were from precipitation and lateral freshwater flows, respectively. Approximately 70 % of the outputs was due to evaporation, with the remaining 30 % being water flow from the lagoon to the sea. Under future drier and warmer conditions, salinity in the lagoon is expected to increase, unless freshwater inputs are enhanced by restoring hydrologic connectivity between the lagoon and the surrounding freshwater bodies. To adapt to expected climatic conditions by the end of 2100 and maintain the current annual average salinity in the lagoon, a more than 50% increase in freshwater inputs should be achieved. This restoration strategy would be fundamental to stabilize and maintain the current ecosystem functionality but could be challenging to implement due to expected reductions in freshwater water availability and competing demands (e.g. in agriculture). In COASTAL workshops these issues have been extensively discussed with the aim to co-create win-win solutions.

Author: Giorgos Maneas (Stockholm University), based on: Manzoni, S., Maneas G., Scaini A., Psiloglou B.E., Destouni G., and Lyon S.W. (2019) Understanding Coastal Wetland Conditions and Futures by Closing Their Hydrologic Balance: The Case of Gialova Lagoon, Greece. Hydrology and Earth System Sciences Discussions, no. August: 1–28. <https://doi.org/10.5194/hess-2019-382>.

Η ΥΔΡΟΛΟΓΙΚΗ ΚΑΤΑΣΤΑΣΗ ΣΤΗ ΛΙΜΝΟΘΑΛΑΣΣΑ ΤΗΣ ΓΙΑΛΟΒΑΣ ΚΑΙ ΠΡΟΤΑΣΕΙΣ ΑΠΟΚΑΤΑΣΤΑΣΗΣ .

Οι παράκτιοι υγρότοποι και οι λιμνοθάλασσες βρίσκονται υπό πίεση εξαιτίας των ανταγωνιστικών απαιτήσεων για πόρους γλυκού νερού και πιέσεων λόγω αλλαγών στο κλίμα. Για τη διαχείριση αυτών των υγροτόπων και τη μεγιστοποίηση της παροχής οικοσυστημικών υπηρεσιών, πρέπει να ποσοτικοποιηθεί η υδρολογική τους ισορροπία. Στον υγρότοπο της Λιμνοθάλασσας Γιάλοβα (ΝΔ Μεσσηνία, Ελλάδα), κατά τη διάρκεια του καλοκαιριού οι βασικές ροές νερού οφείλονται στην εξάτμιση και στην εισροή θαλασσινού νερού, ενώ κατά τη διάρκεια του χειμώνα στις βροχοπτώσεις και στις εισροές γλυκού νερού. Περίπου το 40% και το 60% των εισροών γλυκού νερού προέρχονται από τις βροχοπτώσεις και τις πλευρικές ροές γλυκού νερού αντίστοιχα. Περίπου το 70% των εκροών οφείλεται στην εξάτμιση, ενώ το υπόλοιπο 30% είναι η ροή νερού από τη λιμνοθάλασσα προς τη θάλασσα. Σε μελλοντικές πιο ξηρές και θερμές συνθήκες, η αλατότητα στη λιμνοθάλασσα αναμένεται να αυξηθεί, εκτός εάν οι εισροές γλυκού νερού βελτιωθούν με την αποκατάσταση της υδρολογικής σύνδεσης μεταξύ της λιμνοθάλασσας και των ανάντι αποθεμάτων γλυκών υδάτων. Για τη διατήρηση της αλατότητας στα επίπεδα τιμών που επικρατούν σήμερα (σήμερα έως 2100), υπάρχει ανάγκη να αυξηθούν οι εισροές γλυκών νερών κατά 50%. Αυτή η στρατηγική αποκατάστασης θα μπορούσε να σταθεροποιήσει το σύστημα και τις οικοσυστημικές υπηρεσίες, ωστόσο δεν είναι εύκολο να επιτευχθεί. Ο μακροχρόνιος σχεδιασμός θα πρέπει να συνεκτιμήσει το ενδεχόμενο μείωσης στη διαθεσιμότητα υδάτων (λόγω κλιματικής αλλαγής) και αύξησης της ζήτησης (π.χ. στη γεωργία). Στο πλαίσιο των εργασιών του προγράμματος COASTAL, τα θέματα συζητούνται εκτενώς με στόχο τη συν-δημιουργία κοινά αποδεκτών λύσεων.

1.33. Practice Abstract 33

BIRDS OF GIALOVA LAGOON WETLAND AND ECO-TOURISM.

The Gialova Lagoon wetland is located at the south-westernmost part of the Balkan peninsula, along an important migration route (the Mediterranean/Black Sea Flyway). The wetland serves as the first suitable stopover for many spring migrants who have flown non-stop over the Mediterranean Sea, and the last before their journey back to Africa in the autumn. During the period October 2016-January 2019, 149 bird species were recorded, including 36 threatened species at a European and national level. Nevertheless, the area is located at the core of a complex socio-ecological system and conservation strategies should also consider the existing human activities and social needs. The development of ecotourism activities (e.g. birdwatching) could support wildlife conservation, increase awareness among locals and visitors, and enhance the bonds of the diverse socio-ecological system. Such development was also envisioned by stakeholders participating in the COASTAL project. The fact that species richness and abundance is higher from October to April, could prolong the touristic season and attract visitors outside the high touristic season (May-September), adding to the local economy. Income from eco-tourism could both be an income for the local community making them positive to conservation, and for funding some of the conservation. After all, the wetland has good accessibility, a road taking visitors around and into the lagoon, and the relatively small-sized area makes it possible to see many habitats and a large diversity of birds at close distance, without too much effort.

Author: Giorgos Maneas (Stockholm University), based on: Maneas, G., Bousbouras, D., Berg, H., Norrby V., (2019) Status and distribution of waterbirds in a Natura 2000 area. The case of Gialova Lagoon coastal wetland, Messinia, Greece. In review at Frontiers

ΤΑ ΠΟΥΛΙΑ ΤΗΣ ΛΙΜΝΟΘΑΛΑΣΣΑΣ ΓΙΑΛΟΒΑ ΚΑΙ ΕΥΚΑΙΡΙΕΣ ΓΙΑ ΑΝΑΠΤΥΞΗ ΟΙΚΟ-ΤΟΥΡΙΣΜΟΥ.

Ο υγρότοπος της λιμνοθάλασσας Γιάλοβα βρίσκεται στο νοτιοδυτικό τμήμα της Βαλκανικής χερσονήσου, κατά μήκος μιας σημαντικής μεταναστευτικής οδού (Διάδρομος που ενώνει τη Μεσόγειο με τη Μαύρη Θάλασσα). Κατά την εαρινή μετανάστευση, ο υγρότοπος λειτουργεί ως ο πρώτος σταθμός για πολλά μεταναστευτικά πουλιά που πετούν επάνω από τη Μεσόγειο Θάλασσα, ενώ κατά τη φθινοπωρινή ως ο τελευταίος πριν το ταξίδι τους πίσω στην Αφρική. Κατά την περίοδο Οκτωβρίου 2016 - Ιανουάριος 2019 καταγράφηκαν 149 είδη πτηνών, συμπεριλαμβανομένων 36 απειλούμενων ειδών σε ευρωπαϊκό και εθνικό επίπεδο. Ωστόσο, η περιοχή βρίσκεται στον πυρήνα ενός σύνθετου κοινωνικού-οικολογικού συστήματος και οι στρατηγικές διατήρησης θα πρέπει επίσης να συνεκτιμήσουν τις υπάρχουσες ανθρώπινες δραστηριότητες και ανάγκες της τοπικής κοινωνίας. Η ανάπτυξη του οικο-τουρισμού (π.χ. παρακολούθηση των πτηνών) θα μπορούσε να υποστηρίξει τη διατήρηση της άγριας πανίδας, να ευαισθητοποιήσει τους ντόπιους και τους επισκέπτες και να ενισχύσει τους δεσμούς του κοινωνικού-οικολογικού συστήματος. Μια τέτοια προοπτική αναφέρθηκε και από αρκετούς από τους συμμετέχοντες στα εργαστήρια που πραγματοποιήθηκαν στο πλαίσιο του Ευρωπαϊκού προγράμματος COASTAL. Το γεγονός ότι ο αριθμός των ειδών και οι πληθυσμοί τους στον υγρότοπο είναι υψηλότερα κατά τη χειμερινή περίοδο (από Οκτώβριο έως Απρίλιο), θα μπορούσε να προσελκύσει επισκέπτες έξω από την υψηλή τουριστική περίοδο (Μάιος-Σεπτέμβριος). Εξάλλου, ο υγρότοπος έχει καλή πρόσβαση, υπάρχει δρόμος που οδηγεί τους επισκέπτες γύρω και μέσα στη λιμνοθάλασσα ενώ εξαιτίας της μικρής της έκτασης είναι δυνατή η παρακολούθηση πολλών οικοτόπων και πτηνών σε κοντινή απόσταση, χωρίς πολύ μεγάλη προσπάθεια. Μια ενδεχόμενη παράταση της τουριστικής περιόδου βασισμένη σε εναλλακτικές μορφές τουρισμού θα είχε σημαντικά οφέλη για την τοπική οικονομία, ενώ μέρος των εσόδων θα μπορούσε να χρησιμοποιηθεί σε δράσεις διατήρησης και προστασίας του υγροτόπου.

1.34. Practice Abstract 34

ECOLOGICAL STATUS OF GIALOVA LAGOON AND THE COASTAL WATER BODIES

Land-sea interaction is an important factor to consider in coastal management activities. The Gialova lagoon and surrounding coastal waters in SW Greece are characterized by expanding coastal tourism and agricultural activities, the latter leading to hazardous by-products from olive oil production. The ecological quality status (ES) of coastal and transitional waters has become a priority issue after the legislative implementation of the European Water Framework Directive (WFD, 2000/60/EC). In order to assess the ES of the study area, benthic communities were sampled in Gialova lagoon and adjacent coastal waters. Concerning the ecological status, the lagoon stations are classified as “bad” or “poor”, whereas coastal stations are mostly classified as “good” or “high” ecological status. This could be an indication of agricultural waste run-off, which is in part buffered by the lagoon, which is a more vulnerable ecosystem due to its hydrological and geo-morphological characteristics.

Η ΟΙΚΟΛΟΓΙΚΗ ΚΑΤΑΣΤΑΣΗ ΤΗΣ ΛΙΜΝΟΘΑΛΑΣΣΑΣ ΓΙΑΛΟΒΑΣ ΚΑΙ ΤΩΝ ΠΑΡΆΚΤΙΩΝ ΥΔΆΤΩΝ.

Η αλληλεπίδραση ξηράς και θάλασσας αποτελεί σημαντικό παράγοντα που πρέπει να λαμβάνεται υπόψη στις δραστηριότητες διαχείρισης παράκτιων περιοχών. Η λιμνοθάλασσα της Γιάλοβας και τα παράκτια ύδατα της Νοτιοανατολικής Ελλάδας χαρακτηρίζονται από την αύξηση του παράκτιου τουρισμού καθώς και την εντατικοποίηση των γεωργικών δραστηριοτήτων, οι οποίες οδηγούν σε επικίνδυνα υποπροϊόντα από την παραγωγή ελαιολάδου. Η οικολογική ποιότητα των παράκτιων και μεταβατικών υδάτων αποτελεί ζήτημα προτεραιότητας για την εφαρμογή της ευρωπαϊκής οδηγίας πλαίσιο για τα ύδατα (WFD, 2000/60/ΕΚ). Προκειμένου να αξιολογηθεί η οικολογική ποιότητα των επιφανειακών υδάτων συλλεχθηκαν δείγματα στη λιμνοθάλασσα Γιάλοβα και τα παράκτια ύδατα της περιοχής μελέτης. Οι σταθμοί της λιμνοθάλασσας ταξινομήθηκαν σε «ελλιπή» ή «κακή» οικολογική κατάσταση, ενώ οι παράκτιοι σταθμοί ταξινομήθηκαν κυρίως σε «καλή» ή «υψηλή» οικολογική κατάσταση. Αυτό υποδεικνύει ότι η απορροή των γεωργικών αποβλήτων περιορίζεται εν μέρει από τη λιμνοθάλασσα, που παράλληλα αποτελεί πιο ευάλωτο οικοσύστημα λόγω των υδρολογικών και γεωμορφολογικών χαρακτηριστικών της.

1.35. Practice Abstract 35

SW MESSINIA STAKEHOLDER PARTICIPATORY WORKSHOPS

As part of the EU funded COASTAL project (<https://h2020-coastal.eu>) a series of sectoral and multi-sectoral workshops took place between June 2018 – June 2019 in Messinia, aiming to understand the underlying socio-ecological dynamics that put pressures on the ecosystem, which includes high natural value farmland and a coastal wetland that is part of the NATURA2000 network. This understanding is vital to create a mutual and comprehensive knowledge of the human-environment interactions, as stakeholders can bring useful insights and local knowledge on the components and interactions of the system. In addition, stakeholder participation increases the acceptability of regional planning and the effectiveness of management strategies, when planning for future uses that avoid conflicts and more pressures on the environment. In Messinia the workshops included olive farmers, fishers, olive mill owners, tourism industry, policymakers, NGOs and scientists. During these workshops, participants and scientists use mental maps and causal loop diagrams to co-create a system dynamics model of the area. During these, participants showed enthusiasm and were happy to be given the opportunity to discuss common issues within their sector and in many cases showed awareness of how their activities affected other sectors. Similar discussions have never happened before as it was pointed out. Agriculture and olive-oil production, and partly tourism were recognised as putting the higher pressures on the marine and coastal ecosystems while the overall feeling was that the lack of communication and cooperation, together with issues linked to the lack of education of the local population are major obstacles to advances in local economy.

ΝΔ ΜΕΣΣΗΝΙΑ ΣΥΜΜΕΤΟΧΙΚΑ ΕΡΓΑΣΤΗΡΙΑ ΕΝΔΙΑΦΕΡΟΜΕΝΩΝ ΜΕΡΩΝ

Το διάστημα μεταξύ Ιουνίου 2018 - Ιουνίου 2019 πραγματοποιήθηκαν στην Μεσσηνία συμμετοχικά εργαστήρια με στόχο την κατανόηση των κοινωνικο-οικολογικών δυναμικών που δημιουργούν πιέσεις στα οικοσυστήματα της περιοχής. Η κατανόηση αυτή είναι σημαντική για την δημιουργία κοινής και ολοκληρωμένης γνώσης αναφορικά με την περιοχή και τις ανθρωπο-περιβαλλοντικές αλληλεπιδράσεις, αναγνωρίζοντας ότι οι τοπικοί παράγοντες μπορούν να προσφέρουν χρήσιμες πληροφορίες και τοπική γνώση στα χαρακτηριστικά και τις αλληλεπιδράσεις του συστήματος. Επιπλέον, η συμμετοχή τοπικών παραγόντων αυξάνει την αποδοχή των αποτελεσμάτων και την αποτελεσματικότητα των διαχειριστικών σχεδίων με στόχο των περιορισμό των συγκρούσεων και των πιέσεων στο περιβάλλον. Στη Μεσσηνία τα εργαστήρια συμπεριλάμβαναν τον αγροτικό τομέα, την αλιεία, τα ελαιουργεία, τον τουρισμό ΜΚΟ, αρμόδιους χάραξης πολιτικής και διοίκησης και επιστήμονες. Κατά τη διάρκεια αυτών οι συμμετέχοντες χρησιμοποίησαν νοητικούς χάρτες και διαγράμματα αιτιωδών βρόχων για να συν-δημιουργήσουν ένα δυναμικό μοντέλο του συστήματος της περιοχής. Οι συμμετέχοντες έδειξαν ενθουσιασμό και δήλωσαν ευχαριστημένοι που είχαν τη δυνατότητα να συνομιλήσουν για ζητήματα που αφορούν τον τομέα τους, ενώ σε πολλές περιπτώσεις έδειξαν πως αναγνωρίζουν τις επιπτώσεις των δραστηριοτήτων τους σε άλλους τομείς. Στις καλλιέργειες την παραγωγή ελαιολάδου, και λιγότερο στον τουρισμό αποδίδονται οι περισσότερες ευθύνες, από τους συμμετέχοντες για τις πιέσεις στα θαλάσσια και παράκτια οικοσυστήματα ενώ κυριάρχησε η αντίληψη πως η απουσία επικοινωνίας και συνεργασίας σε συνδυασμό με την έλλειψη παιδείας αποτελούν τα πιο σημαντικά εμπόδια στην εξέλιξη της τοπικής οικονομίας.

1.36. Practice Abstract 36

STATUS OF THE SMALL RIVERS OF WEST MESSINIA

HCMR has conducted several sample campaigns in the small rivers of West Messinia between January 2018 and August 2019. Specifically, physicochemical parameters were measured nine times, while biological ones three times, all at twelve river sites in total, including the river outlets to the sea and upstream locations. According to the measured physicochemical data (88 samples in total), the physico-chemical water quality, which is based on a combination of the nutrient and dissolved oxygen (DO) water conditions, ranged between high and moderate, whereas the majority of the examined stations scored good (86.1%) and high (10.1%) quality. There was not any sample site with quality scores Poor and Bad. Even the score Moderate has been recorded only three times, once at each site (three sites), when high nutrient and low DO concentrations were recorded. The reason could not be identified with certainty, but this moderate status could be connected either with point or non-point pollution sources, such as wastes from olive oil mills, agrochemicals runoff, etc. On the other hand, the biological parameters, namely macroinvertebrates and diatoms, have indicated many river locations at poor or bad status, showing that aquatic life can be disturbed even under good physicochemical conditions of river waters. Overall, the physicochemical quality of the small rivers in West Messinia is not characterized by any important problems within the period Jan 2018 – Aug 2019, however, the biological quality was much poorer and has revealed the real, pressured conditions of the area due to the local human activities

Η ΚΑΤΑΣΤΑΣΗ ΤΩΝ ΠΕΜΆΤΩΝ ΤΗΣ ΜΕΣΣΗΝΪΑΣ

Το ΕΛΚΕΘΕ διενήργησε αρκετές δειγματοληψίες στα μικρά ποτάμια της Μεσσηνίας μεταξύ Ιανουαρίου 2018 και Αυγούστου 2019. Συγκεκριμένα, οι φυσικοχημικές παράμετροι μετρήθηκαν εννέα φορές, ενώ οι βιολογικές τρεις φορές, σε σύνολο δώδεκα συνολικά θέσεις ποταμών, συμπεριλαμβανομένων των εκβολών τους στη θάλασσα και ανάντη θέσεων. Σύμφωνα με τα μετρούμενα φυσικοχημικά δεδομένα (συνολικά 88 δείγματα), η φυσικοχημική ποιότητα του νερού, η οποία βασίζεται σε συνδυασμό οξυγόνωσης του νερού (διαλυμένο οξυγόνο - DO) και συγκέντρωσης θρεπτικών, κυμάνθηκε μεταξύ υψηλής και μέτριας κλάσης, ενώ η πλειοψηφία των σταθμών κυμάνθηκε μεταξύ καλής (86,1%) και υψηλής (10,1%) ποιότητας. Δεν υπήρχε δείγμα με βαθμολογία ποιότητας φτωχή και κακή. Ακόμη και η μέτρια βαθμολογία καταγράφηκε μόνο τρεις φορές, μία ανά θέση (τρεις θέσεις), όταν καταγράφηκαν υψηλές συγκεντρώσεις θρεπτικών ουσιών και χαμηλές συγκεντρώσεις DO. Ο λόγος δεν μπόρεσε να προσδιοριστεί με βεβαιότητα αλλά θα μπορούσε να συνδεθεί είτε με σημειακές πηγές είτε με μη σημειακές πηγές ρύπανσης, όπως ελαιοτριβεία, απορροές αγροχημικών κ.λπ. Από την άλλη πλευρά, οι βιολογικές παραμέτροι, δηλαδή τα μακροασπόνδυλα και τα διάτομα έχουν καταδείξει πολλές τοποθεσίες ποταμών με φτωχή ή κακή κατάσταση, φανερώνοντας ότι η υδρόβια ζωή μπορεί να διαταραχθεί ακόμα και κάτω από καλές φυσικοχημικές συνθήκες των ποτάμιων υδάτων. Συνολικά, η φυσικοχημική ποιότητα των μικρών ποταμών στη Δυτική Μεσσηνία δεν χαρακτηρίζεται από σημαντικά προβλήματα κατά την περίοδο Ιανουαρίου 2018 - Αυγούστου 2019, ωστόσο, η βιολογική ποιότητα ήταν πολύ φτωχότερη και αποκάλυψε τις πραγματικές, πιεσμένες συνθήκες της περιοχής λόγω των τοπικών ανθρώπινων δραστηριοτήτων.