

Final Event

The 7 Key Performance Indicators toward an effective coastal erosion prevention and integrated maritime spatial planning in EUSAIR

Virtual Session 2.7.2020

<https://us02web.zoom.us/j/86839598655?pwd=K2dqeldCRCTvbGQ0TEJqRVNmVUvdz09>

Michela Cariglia-ARTI
Blue Economy Expert

Outline:

- 1) Triton at a glance
- 2) Triton as sustainable development tool for Adriatic – Ionian area
- 3) The 7 key performances indicators
- 4) The applicability in EUSAIR
- 5) Conclusion: the replicability of TRITON as a model

Triton @ a glance/1

Triton is an **innovative approach** to the coastal erosion phenomenon in Adriatic – Ionian area based on the following assumption:

Learning – Testing- Training

It aims at enhance the **awareness** on **coastal erosion risks and prevention** trough the capitalization of existing results from different experiences, testing the effect of shared KPI in different situation and training the operators and technicians on the tools toward an integrated model of DSS.

Triton as sustainable development tool: what we do for ICZM and Legislation Framework

Triton PP's coordinated by Apulia Region is working together on the following main aspects:

- a) **Census** on State of Art on Integrated Coastal Management Zone scouting the best practices, the projects results and the bottom up challenges/difficulties
- b) Analysis on the **indicators effectiveness** at Adriatic-Ionian level
- c) Development of a Platform as **repository of data** between Greece and Italy as tool to support the DSS
- d) **Test the tools** and the KPI in specific areas in Greece and Italy
- e) Spread out the **knowledge on coastal erosion risks and prevention** through the Training Days and Summer School
- f) Enhance the awareness on coastal erosion risks and prevention through a Paper Position for EUSAIR

Triton as sustainable development tool/2

Development of a Platform as **repository of data** between Greece and Italy as tool to support the DSS

The lack of coordination of information is going to be overcome through the development of an open platform on project website

<https://greece-italy.eu/rlb-funded-projects/triton/>

able to give a framework for each stakeholders involved in the coastal management.

The main utilities from platform are finalized to give accessible data to support the decision on coastal management and risks prevention at different level.

It supports **the paradigm of decision makers** because it supports the scenario analysis for stakeholders at local, regional and international level.

The ICZM and MSP as opportunities

Water is simultaneously a resource and a threat. It is of central importance to our socioeconomic wellbeing and it becomes a hazard when there is too much, too little, or if the quality is poor.

Water poses challenges and opportunities throughout the country (and the world). These challenges and opportunities are often acutely evident in coastal areas, which are both incredible national resources and sites of significant vulnerability. Factors like population growth and land use change combine with high impact weather events to threaten coastal communities.

Furthermore, many communities that already suffer the effects of high impact weather will face new and magnified risks over the coming decades due to ongoing changes in climate. Effective coastal risk management depends on minimizing vulnerabilities while preparing for and responding to unavoidable hazards.

The 7 Key performance indicators

Within TRITON project we identified seven key approaches for advancing coastal risk management. These seven approaches are:

1. Provide Actionable Information
2. Prepare and Empower Information Users
3. Create Decision Support Products and Services that Harness Scientific Advances for Societal Benefit
4. Build Strong Partnerships Among Stakeholders, Practitioners, and Information Providers
5. Develop the Next Generation Workforce
6. Align Roles and Responsibilities
7. Recognize Linkages and Potential Leverage



1) Provide Actionable Information (observations, science, and forecasts)

Coastal risk management can be enhanced through improvements in **observational capabilities, science (including research, data assimilation, and models), and computational power.**

For any particular weather or climate event, sources of water may include precipitation, tides, waves, sea level rise, storm surge, and rivers. Factors that influence water's behavior **include geomorphology, hydrological connectivity, land use patterns and grey or green infrastructure** (e.g., marshes, wetlands, levies, seawalls, and other physical barriers). Forecasts of water quantity and quality are most useful when they account for all sources of water and all factors that influence water's behavior.

Providing **accurate information along the coasts is particularly difficult**, both because of observational gaps and lack of interoperability among different modeling approaches (e.g., river forecast, wave, ice, estuarine hydrodynamic, and storm surge models).

In addition, it is important to **understand the linkages among weather, water, and climate**, and to confront the specific challenges that arise over different weather and climate timescales (i.e., minutes to two weeks; two weeks to two months; and two months and beyond).

The **natural and social sciences** also provide critical information relating to coastal risk assessment and management. For example, the natural sciences help reveal potential human health related impacts and responses of biological systems—including the potential to enhance or disrupt biological resources and the goods and services that they provide to coastal communities.

The social sciences help reveal **the socioeconomic implications** of weather events, which can disrupt social institutions and disturb biological resources upon which coastal communities often depend in complex ways. Critically, improved integration of physical, natural, and social sciences is necessary for understanding linkages among the physical climate system, biological systems, and socioeconomic wellbeing.

1) Provide Actionable Information (observations, science, and forecasts) → Triton Solution

TRITON demonstrated by **bottom approach** based on the work project and survey carried among the different stakeholders that the data are coming out from different sources provide actionable Information toward a **DSS and CDSS** (Coastal Decision Supporting System).

The physical, natural, and social sciences is necessary for understanding linkages among the physical climate system, biological systems, and socioeconomic wellbeing **so in both best practices** Ugento and Bari Fesca San Girolamo has been demonstrating

how the interaction of data must be processed with forecast and predictability as far as concern the intervention.



1) Provide Actionable Information (observations, science, and forecasts) → Triton Solution

However, their economic valuation could help develop emergent EU policy such as the Marine Strategy Framework and the protocol on ICZM in the Mediterranean and EUSAIR.



1) The best practice deployed in TRITON together with pilot cases put a value **on the coastal management as indicator**.

2) The value is based on real costs of each intervention and value of activities before and after the works through PPP's.

https://literatur.thuenen.de/digbib_extern/dn060952.pdf

3) Within TRITON are also identified the **financial instruments to follow up** with the action for coastal management and risk of erosion prevention such as Blue Growth funds, DG MARE funds and EIB.



2) Prepare and Empower Information Users

Stakeholders, emergency managers and other practitioners, policy makers, the media, and the public need to be equipped to use information effectively. This can greatly enhance the value of information.

Formal education at all levels (pre-K through college and graduate training) and informal education are central to the development of people's capacity to take up and use information effectively.

Effective communication and stakeholder engagement are also critical in building an informed public that recognizes coastal vulnerabilities, effectively weighs options for risk management, and knows how to respond appropriately when confronting hazards. Public awareness is also a central component of effective governance in a democratic society, as policy decisions and funding priorities ultimately reflect the choices of the people.

Influxes of people and turnover among coastal populations ensure that efforts to prepare and empower information users must be ongoing. Similarly, long periods of time between the recurrence of high impact events require strategies for overcoming complacency and for ensuring that people know how to respond to threats and opportunities in a timely and constructive manner.

Finally, insights from the social sciences can improve our understanding of how to **engage effectively with** stakeholders, emergency managers and other practitioners, information users, policy makers, the media, and the public. Most notably, though not exclusively, through enhanced risk communication.

2) Prepare and Empower Information Users → Triton Solution

TRITON best practices have got an innovative approach to the coastal erosion management using standardized integration for the phenomenon in Adriatic – Ionian area based on the following assumption:

Learning – Testing – Training

It aims at enhance the awareness on coastal erosion risks and prevention trough the capitalization of existing results from different experiences, testing the effect of shared KPI in different situation and training the operators and technicians on the tools toward an integrated model of DSS and CDSS.

I

n fact, Triton Work project highlighted together with the Regional Legislative framework the lack in coordination of tools.

The learning phase in Triton demonstrate also the necessity to capitalize the existing results from previous project with the integration with GIS and WEB GIS system toward a more effective land sea interaction
<https://www.geospatialworld.net/article/web-gis-platform-for-integrated-coastal-environmental-monitoring/>

2) Prepare and Empower Information Users → Triton Solution

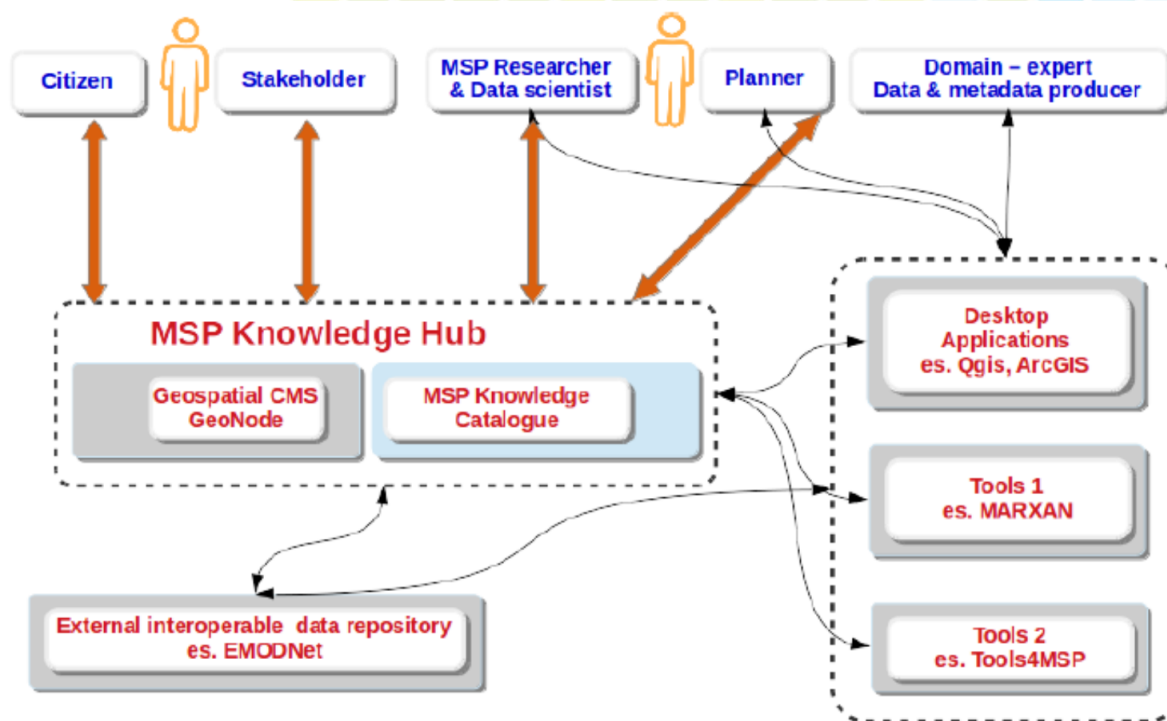
In fact, Triton Work project highlighted together with the Regional Legislative framework the lack in coordination of tools.

The learning phase in Triton demonstrate also **the necessity to capitalize the existing results** from previous projects with the integration with GIS and WEB GIS system

toward a more effective land sea interaction

<https://www.geospatialworld.net/article/web-gis-platform-for-integrated-coastal-environmental-monitoring/>

2) Prepare and Empower Information Users → Triton Solution



3) Create Services and Decision Support Products that Harness Scientific Advances for Societal Benefit

Information is necessary but not sufficient for effective coastal risk assessment and management. In order for users and stakeholders to take advantage of the information generated by the weather, water, and climate community, that information must be in forms that are easy to access and that meet users' needs.

Products and services that are tailored to user needs make it easier **for municipalities to integrate risk management into their decision-making.**

Big data and data analytics offer increasing potential to contribute to risk management services and decision support products. To be effective, there is need for a common and straightforward data collection systems, formatting, and user-friendly access. Data (and model) interoperability among information providers and users can enhance uptake and use.



Efforts to reduce repetitive losses may be particularly promising. One option to reduce repetitive losses is to conduct National Transportation Safety Board (NTSB)-style analyses following high-impact events. Such efforts could **identify factors contributing to losses and potential responses to avoid recurrence.**

Scenario-based exercises might extend this capability to help identify avoidable risks ahead of time and recommend response options, perhaps somewhat similar to stress tests for banks. Such efforts could inform voluntary buyouts programs and regulatory responses.

3) Create Services and Decision Support Products that Harness Scientific Advances for Societal Benefit → Triton Solution

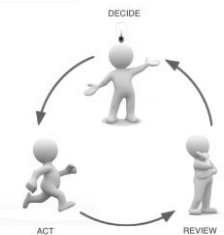
Analysis on the indicators effectiveness at Adriatic-Ionian level

Development of a Platform as repository of data between Greece and Italy as tool to support the DSS and CDSS.(coastal DecisionSupporting System).

Within TRITON project, a web repository under WP3.4 has been created for all the ICZM and MSP Knowledge Hub has been developed to provide access to data, tools and knowledge to all types of users.

The web repository should also facilitate integration and concatenation multiple tools sharing the datasets through standard and interoperable services.
<https://www.bariinnovazione sociale.it/waterfront-di-san-girolamo-di-bari/>

Triton took into account even the results and methodology developed by SUPREME project finalized to to support the implementation of Maritime Spatial Planning in EU Member States within their marine waters in the Eastern Mediterranean, including the Adriatic, Ionian, Aegean and Levantine Seas and to launch and carry out concrete, cross-border MSP cooperation initiatives between Member States in the Eastern Mediterranean. <http://www.msp-supreme.eu>

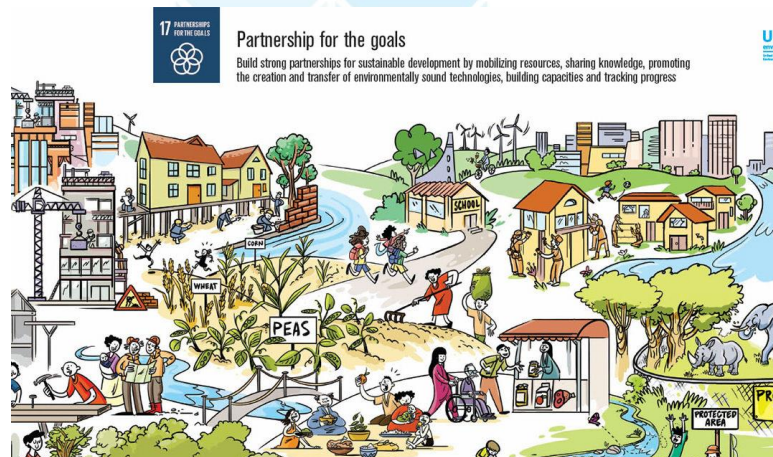


"There is nothing so inefficient as very efficiently doing things that should not be done at all."



4) Build Strong Partnerships Among Information Providers, Users, and Stakeholders

Common opportunities and challenges exist in determining public, private, and academic roles across the weather, water, and climate enterprise. Understanding differing perspectives, values, and priorities is critical to successful engagement efforts and collaboration. **Efforts to manage water resources have the best chance of success when all stakeholders understand and respect differing views, and work to identify shared values that can be advanced together.**



4) Build Strong Partnerships Among Information Providers, Users, and Stakeholders

There is a need for strong, sustained networks of connected partners working together across federal agencies and among local, regional, and federal organizations and stakeholders. **These relationships must be built and maintained over time.**

That often requires **investments of resources** to support collaborative structures and relationships. Institutionalizing key relationships, including **focusing on effective mechanisms for bringing groups together**, can make them more robust in the face of personnel turnover within agencies and among experts and service providers.



4) Build Strong Partnerships Among Information Providers, Users, and Stakeholders → Triton Solution/1

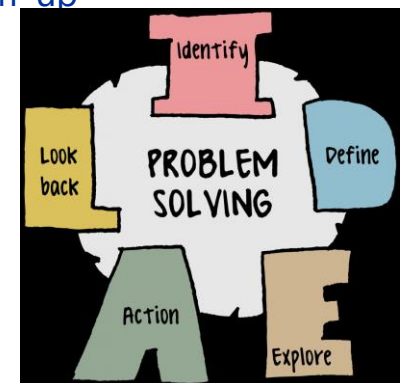
Different tools compose TRITON's output.

The Position Paper summarizes the key performance indicators for the area analyzed and linked to effective-based legislation in the EUSAIR's perspective.

The position paper is able to enhance the awareness on coastal erosion risks and prevention not only on the Pillar of Blue Growth for EUSAIR but even for other similar areas for the indicators considered. As best practice TRITON tests the bottom up approach on the field.

Survey and work project demonstrate the different point of view for the topic based on the scheme:

Problem to solve →
Current Situation →
Possible solution



Besides, Triton provides a pattern of follow up actions for finance intervention and warm suggest the adoption of MoU among different stakeholders toward an Integrated Maritime Spatial Planning at least for Adriatic – Ionian area. As identified in ADRIPLAN form IELMS and United Nation Panel for Adriatic and Ionian Region the European and international experiences provide a number of guiding documents supporting the implementation of cross-border and/or transboundary implementation in MSP.

4) Build Strong Partnerships Among Information Providers, Users, and Stakeholders → Triton Solution/2

The integrative steps mainly refer to the pre-planning phase and are related to:

- 1) Establishment of an informal transboundary working group, also relying on already existing mechanism of cooperation (step 1);**
- 2) Proposal for cross-border or transboundary area(s) to be planned (step 2);**
- 3) Definition of common planning and management goals (step 3);**
- 4) Data alignment and sharing, part of the data management (step 7)**
- 5) Analysis and assessment of human activities having a highly transboundary nature (step 9).**

Stakeholders' engagement is considered relevant for all phases and steps, considering also the need to ensure proper involvement of stakeholders representing all levels of the governance systems (multi-scalar stakeholder engagement) Lastly, according to the recent EU recommendation, TRITON provides a pattern of instruments for PPP's building and a road map for using EIB funds.

TRITON identifies a Multi-scalar stakeholder engagement as a relevant component of the multi-scalar approach to MSP and ICZM.

Planners and stakeholders involved in MSP/ICZM at different scales within a country might have different values, motivations, ambitions and interests, which concretely translate into different objectives. It might be the case that some national motivations are hardly understood and accepted by local communities, while these can struggle in bringing their interests to the attention of the national level.

4) Build Strong Partnerships Among Information Providers, Users, and Stakeholders → Triton Solution/3

The interplay among scales of the same multi-scalar MSP process need an engagement with stakeholders at different levels. Engaging stakeholders at the national level generally requires a more formal approach, while stakeholders at the local level normally require more direct and informal methods.

TRITON deployed as best practice the methodology suggested from PartiSEApate project for Baltic Sea:

- **Building a pan Adriatic-Ionian MSP dialogue requires time. The long tradition of cooperation on MSP in the region provides a fertile substrate to continue this process.**
- **The dialogue shall not only involve MSP authorities, but also all involved sectors and stakeholder typologies in general.**

However, in order to speak with a single voice, each sector need time to talk among themselves before talking with other sectors and other stakeholders.

4) Build Strong Partnerships Among Information Providers, Users, and Stakeholders → Triton Solution/4

- The dialogue shall be purposed oriented, in the sense that tangible output should be identified for various phases of the dialogue process.
- More mature forms of cooperation will build-up gradually, moving from initial mutual information to common strategic planning and implementation.
- Considering the previous two points, it makes sense to initially focus on tasks which are both of priority interests and more easily manageable.
- The nature and the focus of the dialogue may change over time, as Adriatic and Ionian countries progress on MSP/ICZM.
- The dialogue must be coordinated by competent experts on MSP/ICZM, maritime sectors, diverse political and institutional frameworks and so on by area and by subject.

5) Develop the Next Generation Workforce

Future generations will be most likely to thrive if the scientists and practitioners who contribute to coastal risk management are trained in the skills and techniques that matter most.

Skills of high value are likely to include expertise in probabilistic modeling, stakeholder engagement, risk communication, integrated risk assessment, data analytics, and the integration of the physical, natural, among others.

A highly skilled and capable next generation workforce combined with the public's well-developed capacity to use that information would be a powerful combination for helping to ensure that coastal communities recognize vulnerabilities and respond effectively to hazards.



5) Develop the Next Generation Workforce → Triton Solution

TRITON training model developed is a best practice because it is based on the area.
The training sessions were two:

- a) Summer School in both Countries with a methodology of frontal lessons, workshops and on-site visit. For each thematic deployed has been carried out a work project by themes which become part of DSS by itself and KPI.
- a) Training days for professional orders, stakeholder's engagement and operators by bottleneck exercise and practical case.

The training pattern demonstrate the efficiency of an area-based integration for coastal management and risk of erosion prevention with the integration of the following elements:

- Adoption of a more area-based approach (instead of a sectoral one) when planning in the marine space,
- Choosing the right limits (and scale) of the marine management units. In the sea delimitation,
- Ensuring G.E.S. of marine ecosystems and waters within the management units.
- Designation of MPAs (expansion of existing network)

6) Align Roles and Responsibilities

Conflicts arise among users who are separated across local, state, and jurisdictions.

This creates a need for aligning responsibilities and jurisdictions, and setting the appropriate spatial scales for management.

Regional and national coordination is needed for issues that exceed local jurisdictions

In addition, coastal risk management will be most effective when **it acknowledges and addresses the realities facing communities and local governments.**

This includes aligning incentives for sustainable development practices and accounting for the multiple, sometimes conflicting, priorities in water management.

Suboptimal allocations of resources can occur when decision-making responsibilities are narrowly focused, and efforts to deal with a problem at one scale can create new problems at other locations or scales.

Though challenging, care is needed to implement solutions that work across spatial and temporal scales and that attempt to account for the needs of all users.

Regional roles with respect to water resource management may include: **setting of standards; identifying best practices; providing a repository of case studies and/or lessons learned; helping to ensure and enhance public goods; regulation; and the provision of resources to local and regional efforts.** Federal efforts that apply to diverse local communities have greater chance of widespread adoption and success.



6) Align Roles and Responsibilities → Triton Solution

TRITON proposes as new practice not a simply observatory but a tool in becoming.

It is composed by **Analysis on the indicators effectiveness** at Adriatic-Ionian level and the development of a Platform as repository of data between Greece and Italy to support the DSS and CDSS focusing on a table of effectiveness as KPI.

Moreover, TRITON proposes to add in every assessment for coastal management and risk prevention **the criteria of putting a price** to coastal ecosystem.

Efforts to reduce coastal risks will have to be undertaken by both private and public entities. TRITON demonstrates that it is essential to make clear where the responsibility of the governments' stops and that of the civilians and private entities begins.

Many economic developments have been placed in hazard-prone areas. Remedial action has been taken to prevent erosion and flooding. In the past most local or other public authority bore the cost of 'protecting' these areas. In this scenario there was little incentive for the property developer to take account of the cost of protecting the development from erosion. This recommendation seeks to rebalance this. By doing so developments are made more sustainable.



6) Align Roles and Responsibilities → Triton Solution

The recommendation proposes a more pro-active approach based on planning and accountability of achievements and provides several criteria to accomplish this.

“Accountable coastal erosion management” is one of TRITON indicator with the following specifications:

- has explicit objectives for a defined timescale;
- defines clear responsibilities at the various levels of administration;
- is based upon an understanding of the sediment balance and long-term trends;
- does not compromise safety, important environmental values and natural resources;
- is based on a cost-benefit assessment;
- is supported by an appropriate budget for both investments and maintenance as well as for a financial mechanism to locally accommodate erosion or its impacts;
- is implemented by technical measures that have proved to be fit for purpose;
- includes a programme to monitor developments and effectiveness of measures;
- determines the duty to publicly report on all above aspects.

The instruments to protect the coastline **is to create a PPP's to improve accountability**

starting for a limited period, with possibilities for review and corrective action before starting a next phase. Too much different types of accountability exist throughout Europe.

h



7) Recognize Linkages and Potential Leverage

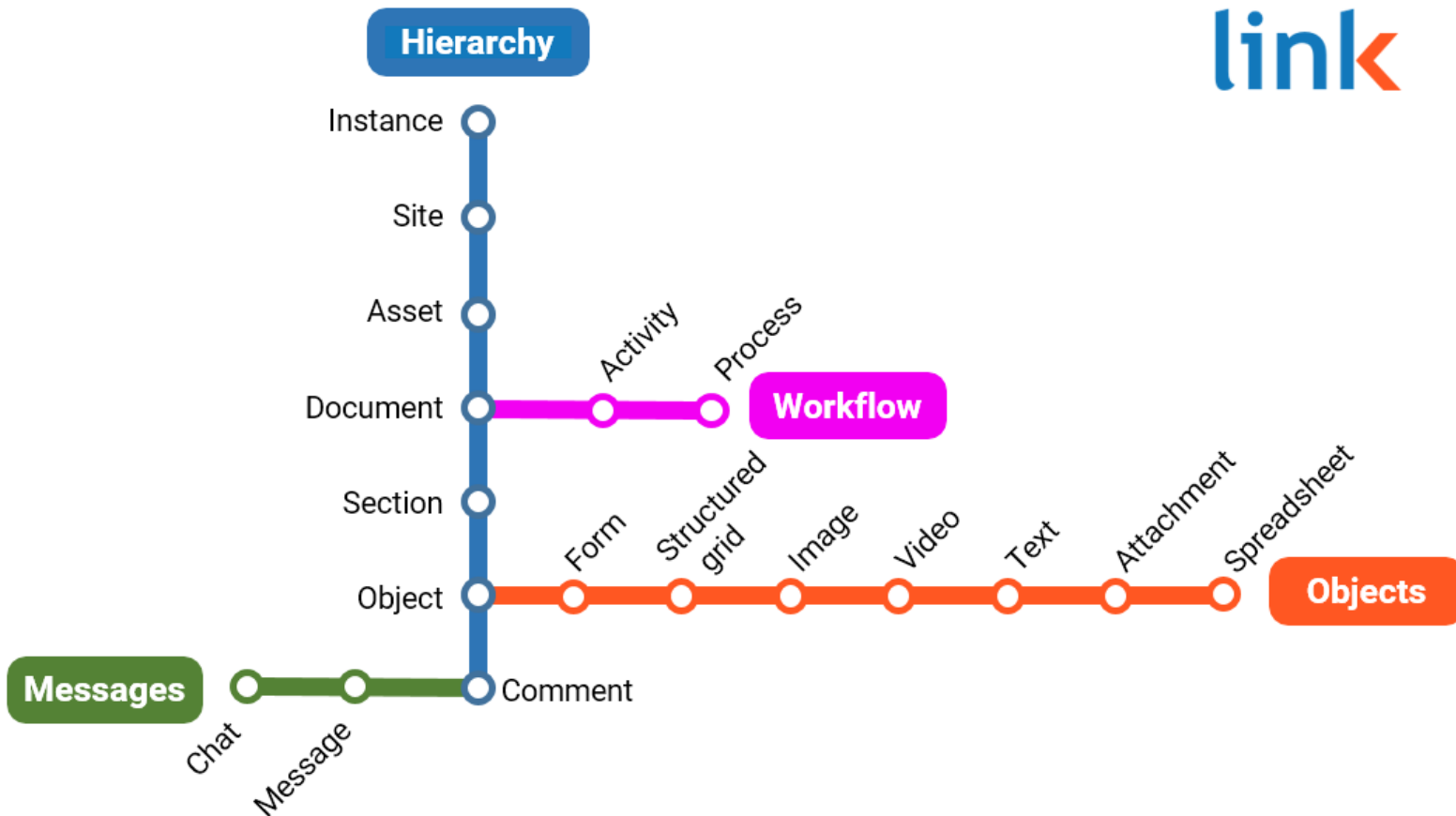
Connecting coastal vulnerability and risk management to other priorities, like infrastructure or jobs, can maximize the effective use of limited resources and help build interest in efforts.

Coastal risk management projects that achieve multiple goals may be more appealing to local communities that must meet many high priority economic and social goals. For example, green infrastructure to mitigate coastal flooding may also provide fisheries habitat and recreational assets. Similarly, coastal projects can create local jobs or provide training in new skills.

Finally, challenges and opportunities to coastal risk management are often at least partly similar throughout the world.

EUSAIR can both learn from other countries and share our resources and information with other countries (e.g., identify common needs, case studies, and lessons learned).

7) Recognize Linkages and Potential Leverage



7) Recognize Linkages and Potential Leverage → Triton Solution

TRITON demonstrates that the coastal management and risk prevention from erosion need to be treat as part of Blue Growth strategy and beyond.

The indicator is connected to “Resilience”.

The coastal resilience statements and their potential contribution to sustainable coastal development were broadly agreed. The implementation of the measures and actions associated with the concepts require:

- Proper assessment of the natural system in terms of sediment- and bio dynamics and awareness of the inherent resilience of the coast;
- Local to regional implementation in other terms the bottom up approach using Triton as methodology for EUSAIR till to similar areas
- Appropriate evaluation and monitoring according to Bayesian Model as well.

7) Recognize Linkages and Potential Leverage → Triton Solution/2

Besides, TRITON best practices took into account the importance to achieve better harmonization in conceptual matters regarding MSP/IMCZ sharing the same regional sea need to:

- better understand neighboring planning systems and context so that eventually they adapt and become more compatible to each other;
- reach a common conceptualization of planning issues and goals; i.e. establish clear and common objectives of management and planning in shared seas
- closely cooperate in gathering and exchanging data and relevant information.

Lastly, TRITON through the platform coordinates the database for WEB GIS and GEO REFERENCE COORDINATION.

In fact, at sea, data is most likely to be missing or to be incompatible with each other (when it exists).

The 7 KPI from TRITON to EUSAIR

Therefore, in cases of cross-border areas, digital geographical data (deriving from different countries) must comply with common standards for metadata, common vocabulary, data transport formats, quality control methods and flags.

At the E.U. level, this compatibility of data is in progress, according to INSPIRE Directive (Infrastructure for Spatial Information in the European Community) TRITON bottom up report define as priority the over bureaucracy. Please see Table no.2.

And there is a clear indication in order to achieve compatibility of geo-data a "common network" for achieve the follows:

- the collection and exchange of necessary spatial data;
- the collection and sharing of results for the approaches and actions adopted based on a joint framework as the one proposed by TRITON.

This process can also be accelerated by anthropogenic pressures: as example, the damming of streams can led to a decrease of sediments transport since they would result trapped behind dams; the extraction of natural resources from the seabed (sand and gas) and water abstraction from groundwater may cause ground subsidence.

In this context, due to the this complex interplay between natural and human-made pressures, the

Mediterranean region is already experiencing a number of environmental impacts, including erosion and degradation of coastal ecosystems, triggering efforts to improve short-term coastal management (Nicholls and Hoozemans, 199



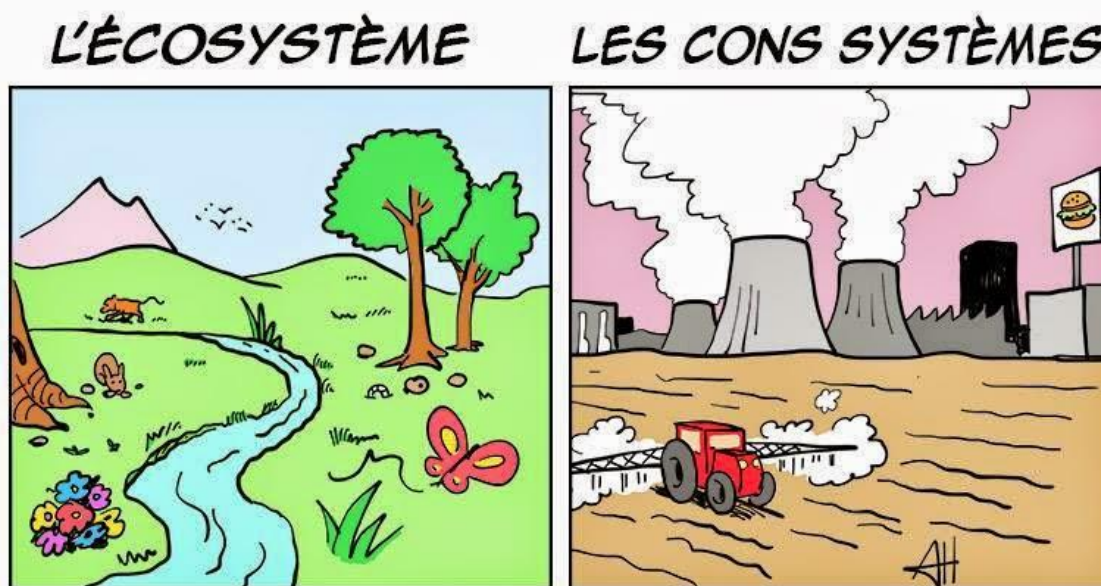
Even though the Mediterranean Sea is not expected to be subjected to sea level rise as the oceans, the region is considered to be a climate change hot-spot due to its specific physical, environmental and socio-economic features. In fact, the Mediterranean region is characterized by low lying coastal areas particularly prone to storm surge flooding events and rising sea level, as sea water can't be stopped by steep slope or dunes providing natural defense to water intrusion (ETC/ACC, 2010; Anzidei et al., 2014, 2017).



Against this background, coastal authorities are faced with the challenging task of balancing coastal development with risk management.

An integrated approach to coastal management is needed to face coastal erosion processes, merging both technical and scientific studies to identify, on one side, the main causes contributing to coastal imbalance and to design,

on the other,
the most appropriate
monitoring actions
for understanding
the trends and the
required
structural measures,
following the order
of priority resulting
from the level of risk.



www.ah-dessinateur.blogspot.be

Thank you for your kind attention!

Michela Cariglia – PM Assistant

ARTI- Regional Development Agency for Technologies and Innovation

cariglia.michela@gmail.com