



Reflection points about the
Implementation of a Healthy Oceans,
Seas, Coastal and Inland Waters Mission

INTRODUCTION

We are entering the United Nations Decade of the Ocean Science for Sustainable Development. The present 10 reflection points have been elaborated through a collaborative process involving different European institutes, initiated by the Norwegian University of Science and Technology – NTNU, and the National Research Council of Italy – CNR. The main aim of these reflection points is to provide inputs to the Oceans Mission Board for the design of the Mission on Healthy Oceans, Seas, Coastal and Inland waters. We hope that our reflections will aid the board in forming the mission to have a strong impact on society and policy making.

As stated in the Horizon Europe framework, mankind is facing grand challenges. These challenges have been recognized by the European Union, but also by United Nations as we are entering the United Nations Decade of the Ocean Science for Sustainable Development. These global threats require a paradigmatic shift in the way solutions are being developed and implemented. To achieve a sustainable future, excessive efforts must be taken. The role of research and innovation will be imperative in this regard.

The Horizon Europe framework recognizes this and has introduced the concept of Missions. In each mission, specific targets will be of focus, and are required to be clearly measurable and achievable. The European Commission has recently established Mission Boards, where 15 experts will be asked to contribute in proposing targets and timelines to design and implement the specific missions.

In view of facilitating the work of the Mission Boards and in structuring the process to tackle its challenges, a reflection among Institutions and Research Organizations at European level, is urgently needed. Thus, the NTNU 4th European Conference bring together a “small world network” of experts from a variety of European Institutions to debate and identify key aspects of consideration for the Mission “Healthy Oceans, Seas, Coastal and Inland Waters”.

The Mission “Healthy Oceans, Seas, Coastal and Inland Waters” addresses a highly complex system. To ensure that «by 2030 the potential of oceans, seas and inland waters, their ecosystems and bio-economies to drive a healthy planet is fully understood, unlocked and harnessed» the impact of investment must be maximized, and the objectives must be focused and feasible. This contributes not only to a health planet for all but will also make it easier for citizens to understand the value of Healthy Oceans, Seas, Coastal and Inland Waters.

We propose to focus on the interlinked system between the marine and terrestrial ones, in a truly integrated vision towards a Good Planetary Status.

The following points address 10 aspects to reflect when shaping the Mission through combining knowledge and technology with innovative collaborations with business, finance, regulatory and governing bodies, and social and cultural institutions.

REFLECTION POINTS

#1 ADOPT SCIENTIFIC METHODOLOGY AND LOOK FOR OPTION ASSESSMENTS.

Decisions should be KNOWLEDGE-BASED. Challenge fake news.

The mission framework should aid decision-makers in identifying and removing cognitive biases, adopting multidisciplinary/ cross-sectoral consultation and dialogue, and asking for impacts assessments. These should become a standard and should be discussed and agreed with all stakeholders as its results might be biased by the choice of the options to assess.

The scientific community can provide accurate, independent and authoritative information to guide policy and industry. To do so, and to deliver fitting messages for our changing world, science, research and innovation need clear communication strategies.

Researchers in media studies have developed solid analysis of the contemporary dangers of “fake news,” which could provide valuable tools in reassessing science-communication strategies, some of which have proven ineffective or vulnerable to denialist rhetoric. In addition to scientific facts, public communication must also employ the skills and knowledge base within media studies regarding audience engagement, political messaging, and varying emotional registers. It requires an ethical approach to three registers: access to the means of knowledge production, affect as a modification of the power to act and action with an understanding of its possible implications.

Despite the fact that scientific knowledge is subject to uncertainties, a scientific approach and methodology should be adopted when making and revising decisions. The identification of critical or urgent aspects and the acquisition of essential data are crucial to disentangle perceptions from accurate predictions and propose appropriate solutions.

#2 VALUE OF INFORMATION OCEAN LITERACY: THE BIGGEST THREAT TO THE OCEAN IS UNAWARENESS

Revision of the methodology. Promotion of interdisciplinarity and ‘lessons learned’ processes, how do we extrapolate positive results – Open channels

Open agendas, open minds, mobility of ideas and people are crucial to make any action impact on systems’ transformations. Young generations need motivation and new trust in transparent messages and processes. One key action to maintain successful in this effort is strengthening and widening scientific collaborations, in all fields.

Communication of complexity without hierarchy between disciplines or sectors is a challenge. Given the increasing demands for improvements in “scientific communication,” environmental humanities offer a multitude of new approaches to public engagement. Without discounting the value of hard data, an equal emphasis should be placed on developing ways to link oceans-focused sciences with the broader human experience, for example through the use of narratives. Making connections to the vast archive of associations between humans and oceans, an awareness of blue humanities can tap into already existing shared knowledges and emotions to better position ocean-related research within public imaginations of the horizons of future human societies. The mission Ocean has the capacity to pioneer the involvement of advanced practices in all sectors of society including in art and culture in a new role as a platform for knowledge exchange and knowledge transfer — across actors, sectors and disciplines.

#3 BALANCE BETWEEN PRESERVATION AND EXPLOITATION. HUMAN WELL-BEING MUST BE POSSIBLE WITHIN SOCIAL, ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY.

Impact of pollution is not restrained to property of ocean areas nor to political barriers. Scientific research can and should contribute to good ocean governance. Sustainability cannot put the environment and the economy on the same level but must be based on a

sound biosphere. Economic actions cannot be designed and planned outside planetary boundaries, that for the oceans are particularly critical. It is crucial that research and innovation can support growth without over-exploitation.

Shared values and collaborative advantages should drive the development of our future. For instance, the oil industry has a finite future, how can we develop our societies further with less dependence on the oil industry? What about critical raw materials? EU CO₂ reduction targets will probably drive large scale offshore energy production, how can we meet these targets and at the same time balance with ecological sustainability? The Mission Ocean has to develop an understanding of sustainability on a different level: Rather than marketing the marriage of economic and ecological interests it is about understanding the actual limits of the very idea of both preservation and exploitation in ocean space.

The European objectives to develop a sustainable blue economy should be the lighthouse when integrating the contributions from research, industry, public authorities and citizens.

Do we have the right tools to assess sustainable development and support policy, considering multiple stressors (climate, direct human impacts) and spatial and temporal variability and fluidity of the ocean environment? More attention should be driven to restoring balance in damaged ecosystems. At this stage, even preservation seems like a very difficult goal, e.g. coral reefs.

The Mission should be able to create transfer of knowledge and collaboration between both European research institutions and United Nation institutions like the High-Level Panel for a Sustainable Ocean Economy.

#4 EUROPE (AND NATIONAL POLICIES IN EUROPE) AS ROLE MODEL AND “LEAD BY EXAMPLE”. TAKE THE RESPONSIBILITY WE CAN.

Europe is in a unique position to take a global lead on research and development for the sustainable ocean and water systems. We have good educational systems, we have research and innovation platforms which can be in the frontier of knowledge development, and we should take this responsibility on a global arena. Be ambitious to induce cultural/system transformations, do not focus on low hanging fruits! The potential of Europe is to act as a field of experimentation for future forms of policy making.

The Missions should make clear Europe's intrinsic relation to Oceans and understanding of the Oceans' relevance not only for a Healthy planet but as the source of life. Oceans' imperative relevance should be promoted from all perspectives. Culture, education, knowledge and innovation are the bases toward European Leadership to understand the Oceans' intrinsic value. The rapid growth in Europe of Environmental Humanities research and educational institutions signals the unique strengths of the European research infrastructure to foster innovative new interdisciplinary developments: examples like the Rachel Carson Center in Munich, the Stockholm Environmental Humanities Laboratory, and the Research Council of Norway's new PhD research school (the Norwegian Research School in Environmental Humanities) all attest to the high demand for such cooperation at national and regional levels. In this context, Universities, as the places where education, research and innovation converge, have to show leadership in the fight against climate change and for a healthy ocean. Universities have to become “vitrines of possibilities” of sustainable futures.

#5 POLLUTION OF THE OCEAN GOES BEYOND PLASTIC: TOWARDS AN INTEGRATED STUDY OF THE OCEANIC EXPOSOME, INCLUDING ALL BIOLOGICAL AND CHEMICAL EXPOSURES

We all have a responsibility to provide the relevant knowledge and behaviors enabling preservation of the planet we live on. The attention on plastics in the oceans has raised a global awareness that we are not taking this responsibility. We cannot talk about the

impact of plastics in the Oceans without clear commitments and actions toward an environmental approach to the production, recirculation and final use of plastics.

Plastics are an important pollutant, but other Ocean pollutants should not be forgotten. Indeed, the Ocean is subjected to many pressures (chemical, biological, physical) and mostly from the continent. These pressures on the marine ecosystem (living organisms, seabed, coastal zones) can in turn affect human health and biodiversity. A strong interconnectivity with other systems has to be established.

The good environmental status depends on multiple stressors: the complexity of the system cannot be linearized and the knowledge of the exposome and its effects could be a valuable issue to drive European investments and regulation of pollutants. In this context, Ocean Health is still a vague concept, with a strong anthropocentric bias. Which metric shall we use? Resilience? Biomass? Matter export? Ecosystem Services? Stability? Internal structure quantified by complex system metrics? Here, the scientific community have a fundamental role to play in order to bring forward the need for conservation and sustainable use of the ocean.

#6 SCIENCE, RESEARCH AND INNOVATION – IMPACT FOR SOCIETY AND IMPACT ON THE ECOSYSTEMS

The EU Framework Programmes for Research and Innovation should help researchers to carefully consider the impact of their work and its implementation on society. Supplying the scientific evidence of the ecological risks, researchers must be ahead in addressing the challenges that we face and to lead in the necessary transition towards sustainable societies.

With special focus on the Mission on Healthy Oceans, Seas, Coastal and Inland waters the EU framework Programmes for R&I should include clear demands to demonstrate impact and define tangible implementation schemes. The effects of the projects proposed on the overall ecosystem at global scale should be highlighted.

#7 THE CIRCULARITY OF THINGS (EVERYTHING IS CONNECTED – INLAND WATERS AND OCEAN ETC)

The marine ecosystem is underrepresented in sustainability research. Life Cycle Assessment is one way of exploring sustainability – the research should lead the way. Humans live in and with the environment: pollution is a product of human activities and the environment is source of products for humans. Solutions have to be “designed” within a system approach, including the land-sea interface and the links with freshwaters.

In order to solve today’s climate and ecological crisis it would be worth to address the root causes of it, which depend on the overall relationship between humanity and the environment, purely considered as the source of natural resources to exploit, and not as the source of life to maintain and support. A fundamental question is: What is considered as socio-economic success?

#8 FOOD PRODUCTION NEEDS SUSTAINABLE COMMITMENTS

Research should be directed to secure food from the oceans by sustainable fisheries, aquaculture technologies and development of harvesting and production of low trophic species, including new socio-economical models to understand societal acceptance and consumer behavior.

The marine ecosystem and in particular the aquaculture industry, is often regarded as the next economic blue-frontier. Today, the marine ecosystem provides us with a wealth of services and has an economic value exceeding 20 trillion USD, predicted to increase drastically in the coming decades. Sustainable commitments and responsibilities for the development should be addressed both at research, scientific, societal and industrial

level. Patterns of industrialization, urbanization and domestication shape the current strategies of valorization of ocean space: from aquaculture to maritime surveillance, from autonomous shipping to deep sea mining.

Aquaculture need to evolve into a socio-environmental concept, also integrating novel methodologies to protect its whole value chain and reduce the impacts on the ecosystem.

#9 EMPOWERING CITIZENS THROUGH OCEANS RESEARCH STRATEGY

Researchers should work interdisciplinary and cross-disciplinary, not only to tackle complex questions, but also to match the purely cognitive knowledge production with affective knowledge production, understanding that affective knowledge production is needed to enhance engagement and impact in society. Embedded within a scientific context, artistic research can make a relevant contribution to enable new alliances of cross-disciplinary collaboration to further develop our understanding of the ocean rather than only trying to protect it.

The oceans are not only a resource to exploit and nurture, or an ecosystem to be studied and protected; they are also a cultural construction. That is, humans have over time accumulated attitudes toward and bodies of knowledge about the oceans; observing, defining, and imagining oceans as they pertain to human endeavors. Researchers working in ocean-related fields stand to gain from learning more about environmental humanities and blue humanities methods and objects of study, which can enrich understandings of the cultural contexts in which ocean research takes place. Any comprehensive program of research on Oceans must take into account the public's emotional investments in the oceans and waterways of their regions; many Europeans have long built their national identities around their links to the sea and bodies of water, a fact that researchers and businesses often ignore at their peril.

#10 FUTURE RESEARCHERS - OPEN THE PLATFORM OF INFLUENCE TO YOUNG & DIVERSE RESEARCHERS, VOICING THE CONCERNS OF THE GLOBAL YOUTH AND SETTING THE AGENDA FOR ACTION AND RESEARCH.

We need input and acceptance from the next generations and from many different cultures. The program must emphasize and incorporate into its platform the fact that research efforts, social efforts and economic efforts are all working for a sustainable future. By questioning what is commonly conceived as natural, original or pristine, both scientific and artistic research challenge conventional forms of measure as they are relating to baselines that are continuously shifting. When trying to overcome this form of "generational amnesia", ocean research faces the problem of shifting baselines.

The mission on Healthy Oceans, Seas, Coastal and Inland waters should appoint a youth mission board to meet the younger citizens. Taking into account the rapid social changes taking place around climate change, with the engagement of young people and indigenous activists at the forefront, Oceans research must address the priorities of future generations and of diverse cultural groups. We need the enthusiasm and the utopianism of the younger generation in order to break the wall of the pure "sense of reality" and to develop a future on the basis of a "sense of possibility". Humanity has shown itself to be immensely powerful; it has to show that it is capable of reversing negative trends. Science will bring opportunities.

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