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Mediterranean
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Strategy for the Water-Energy-Food-Ecosystems Nexus in the Mediterranean Source to Sea Continuum

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1 Context

Water, energy, food and ecosystems are essential resources for human livelihoods and socio-economic development. Agriculture being the largest freshwater consumer in the Mediterranean region. Energy generation is dependent on water for extraction of fossil fuels, hydropower, hydrogen, cooling thermal power plants, biofuel crops, etc., further emphasizes the interconnectedness of these sectors. Both the food and water sectors are energy intensive: around 1/4 of total energy consumption relates to food production and supply, while up to 1/3 of the operating costs of water and wastewater utilities are energy-related, including for desalination.

The sustainable management of all four Water-Energy-Food-Ecosystems (WEFE) components is fundamental for societal well-being and prosperity that encompasses the social, economic, and political considerations. However, because these sectors are heavily cross dependent such management cannot be effectively obtained unless it is done, from the design phase, in an integrated way allowing each one of the four sectors/components to become, on equal footing, an “entry point” into a WEFE Nexus approach. The WEFE Nexus approach builds up on the decades of experience on the Integrated Water Resources Management (IWRM) and the Integrative Methodological Framework (IMF)¹. Acknowledging the key importance of the energy, food and ecosystems preservation sectors in the availability, quality and management of water resources, the WEFE Nexus enables their active engagement in IWRM, supporting its implementation and the realization of its goals. To this end, the WEFE Nexus approach enables integrated action for assessing cross-sectoral trade-offs and synergies, optimizing overall security of resources and facilitating solutions that benefit all sectors, or at least avoid harming the other three sectors when developing activities in each one of them (“no harm principle”).

Given the geomorphological features in the Mediterranean region, water, sediment, biota etc. flows connect land, watersheds, aquifers, wetlands, coast and the activities based therein with the sea, providing a spatial land-sea or Source to Sea (S2S) continuum. Combined pressures of all sectors’ demands are exerted on ecosystems, and the critical services they provide also affecting the marine environment and economy.

The triple crisis of climate change, pollution and biodiversity loss that we are facing enhances risks to the sustainable supply of water, energy, food and to the functioning of terrestrial and marine ecosystems, threatening nature, ecosystem services and human livelihoods, as well as social well-being, political stability and sustainable development. The importance of water footprint, particularly external water imports, cannot be overstated, since most of the Mediterranean countries rely on imported water, highlighting the critical need for sustainable water management practices and the efficient use of water resources to ensure the region's sustainability and resilience in the face of the related challenges. WEFE related risks are exacerbated by rapid population growth in parts of the Region and influenced by governance failures and socio-economic challenges, such as unbalanced, inequitable growth, rapid urbanization, economic activities that are concentrated at large in the coastal zone, unsustainable economic growth and production and consumption patterns, migration, and political instability. The disruption of supply chains has been an extra factor of pressure over recent years. These challenges influence the availability and quality of natural resources and enhance risks when unilateral attempts to reduce these in one WEFE sector may stimulate risks on others. Thus,

¹ Available at

<https://iczmplatform.org/storage/documents/b1wUPA4UtQvagztjcArnXKnDBVN0YqUkg3EWpxi.pdf>

effective governance mechanisms and coordinated efforts are essential to ensure the availability and quality of natural resources while minimizing risks and promoting resilience across all sectors.

Sectoral governance and lack of adequate policy, management and implementation tools for integrated approaches among WEFE sectors and the spatial areas along the S2S continuum where the activities are implemented, constitute an unsuitable framework for effective risk response. Typically, and despite the fact that the most important crises we are facing are the ones related to the environment, the needs of ecosystems are given the least priority when sectors are competing for scarce resources. Analyses, like in the EU White Paper on WEFE Nexus, the MedProgramme Brief WEFE Nexus Country Status Assessments, MedECC special report on the WEFE Nexus, etc., indicated that there are provisions for formal institutional cooperation at country level, however not necessarily translating into policy integration, leading to isolated efforts; lack of inter-sectoral strategic framework as well as inadequate action and investment planning; overlapping responsibilities and competing objectives among local and central governments and sectoral authorities.

At the same time, new powerful tools, like digitization, digitalization, digital transformation, artificial intelligence and better use of space technology, become gradually available and increasingly utilized by all sectors. The integrated design of action addressing the challenges of WEFE components should also take into consideration the socio-economic and cultural continuum of the North-South, East-West interface, which the Mediterranean represents. In this regard, coordinated action at national and Mediterranean levels is needed to reduce risks and increase combined benefits.

There is a growing recognition that system-thinking using the combined WEFE Nexus and S2S management approach, enables sectoral and spatial integration for policy development and implementation, and management of natural resources and socio-economic activities, away from the “silo” sectoral approach in an innovative and effective way. This has the potential to provide multiple benefits to society, by supporting: (a) the adoption of sustainable socio-economic practices that contribute in addressing the triple planetary crisis; (b) enhanced resilience of natural and socio-economic systems and their adaptation to expected risks of climate change; (c) the achievement of global policy goals, such as the Sustainable Development Goals (SDGs), including targets related to clean water and sanitation, affordable and clean energy, sustainable cities and communities, responsible consumption and production, and climate action, as well as EU policy objectives outlined in the European Green Deal related to green energy transition, circular economy, sustainable food systems, preserving biodiversity and healthy living; (d) regional cooperation, social cohesion, conflict prevention, peace building and reconciliation by enhanced multilateralism; and (e) economic development, by supporting job creation, promoting innovation, enabling investments opportunities and investment risk management, while fostering regional economic integration, among others by promoting Circular and Blue Economy.

2. Aim

The Strategy aims to enable the mainstreaming of system-thinking and the application of the WEFE Nexus approach in the Mediterranean Source to Sea continuum within improved and integrated governance structures at different levels.

To catalyze the shift from ‘Nexus thinking’ to ‘Nexus doing’, the Strategy is addressed to countries and stakeholders providing a broad framework in their assistance for improving the integration of policy and management frameworks and instruments across WEFE sectors and spatial components, thereby increasing capacity to minimise risks and maximise benefits related to human livelihoods and socio-

economic development in the Mediterranean S2S continuum. Existing regional frameworks, such as the Barcelona Convention and the Union for the Mediterranean as well as EU schemes for supporting the Mediterranean region and countries through regional and bilateral programs and projects demonstrating the tangible benefits of WEFE Nexus approaches offer the means for policy dialogue, experience sharing as well as technical assistance for design, implementation and monitoring of such arrangements at Mediterranean level.

3. Goals, objectives, and directions for action

Three Goals, supported by a set of eight Objectives, are identified in order to achieve the overall aim of the Strategy. To this end, leadership and political will are fundamental. For implementing the needed effective governance, all the tools should be employed, including policy formulation and enforcement, investment and access to finance, proper utilisation of science and technology as well as education, awareness raising, encouragement of ownership by engagement and empowerment of non-state actors, including women and youth, the contribution of whom is fundamental. The Goals and Objectives are complemented with examples of directions for action which should be considered to be implemented as best fitted to and in alignment with national laws.

Goal 1: Appropriate institutional arrangements, policies, and cooperation frameworks are established at country and regional levels.

Implementing the WEFE Nexus approach requires, and leads to, institutional and policy frameworks that provide for coordination between different levels of governance and integrated action across the WEFE sectors as well as segments and actors in spatial management domains in the S2S continuum, and effective cooperation between all stakeholders.

Objective 1.1: Develop and/or accordingly adapt appropriate governance structures at all levels to implement the WEFE Nexus approach in the S2S continuum.

Actions at all governance levels – regional, national, and local, including transboundary, as appropriate – is necessary. A coordination arrangement at Mediterranean level is essential to facilitate synergies and action. Institutionalization of coordination mechanisms, and possibly structures, at country level is necessary to achieve adequate horizontal and vertical integration among WEFE sectors and across governance levels in the S2S continuum, *vis*: in basins, aquifers, coastal zones and marine areas.

Directions for action

- 1.1.1. Encouraging regional as well as transboundary cooperation governance settings in implementing the WEFE Nexus approach in the S2S continuum.
- 1.1.2. Establishing and/or enhancing country-level cross-sectoral and inter-spatial coordination mechanisms or structures.
- 1.1.3. Enhancing the capacities of relevant bodies, for implementing the WEFE Nexus approach in the S2S continuum.
- 1.1.4. Ensuring effective decentralization in decision-making and that sub-regional and/or cultural distinctive features are taken into account, engaging and empowering local actors and ensuring a fair transition that leaves no-one behind.
- 1.1.5. Creating the necessary institutional and legal framework and processes for planning, financing and implementing WEFE Nexus interventions at scale and monitoring their impact.
- 1.1.6. Facilitate Regional dialogue processes and forums for exchange of knowledge and experience.

Objective 1.2: Mainstreaming WEFE Nexus approach in the S2S continuum into policies and strategies.

Policies and other strategic documents within each WEFE sector should consider and internalise, accordingly, elements of a cross-sectoral approach. Harmonization of strategic documents pertinent to the WEFE sectors and across the basin/aquifers, coastal zones and marine areas should be fostered, promoting integrated natural resources and ecosystem management while ensuring linkages with global policy goals (SDGs, climate change mitigation / adaptation planning, energy transition, circular economy, etc.).

The EU acquis, the relevant work and legislation under the UN at global and regional level and Mediterranean Strategy for Sustainable Development and its flagship initiatives may serve as a framework for advancing the integrated management of natural resources and related governance settings in the region.

Directions for action

- 1.2.1. Developing new, or updating existing, regional strategic documents and action plans for implementing the WEFE Nexus approach in the S2S continuum, including as contribution to achieving agreed regional and global policy goals (e.g. SDGs, climate action).
- 1.2.2. Screening major Regional sectoral initiatives from a WEFE Nexus perspective and ensuring that they do not affect in a negative way the key needs and considerations of the other (three) sectors.
- 1.2.3. Ensuring harmonization across sectoral and spatial “chapters” of national strategies and plans to avoid inconsistencies with sectoral and spatial planning, assisted by WEFE Nexus assessments including governance analysis, scenarios development and modelling supported by multi-stakeholder dialogue.
- 1.2.4. Developing or adjusting existing instruments, processes, requirements, guidelines for increasing horizontal and vertical integration in policy making, implementation and monitoring.
- 1.2.5. Benefiting from the use of integrated management approaches (IWRM, Integrated Coastal Zone Management (ICZM), Ecosystem Based Adaptation (EBA), etc.) to speed up implementation of WEFE Nexus across sectors and spaces within the S2S continuum.

Goal 2: Efficient and effective planning, financing and implementation of management and technical solutions.

Supporting the identification, mainstreaming, financing and implementation of innovative WEFE Nexus managerial and technical solutions, including Nature-based Solutions, across the S2S continuum is key for meeting all objectives in an efficient manner. Piloting and replicating of such solutions are key for proofing WEFE Nexus benefits and fostering upscaling. Digital transformation, including space-related technologies and, in general, provision of innovative tools for moving into a new era. These efforts play a crucial role in providing evidence of the advantages of integrated WEFE Nexus approaches, encouraging investment, and facilitating the transition toward sustainable resource management practices on a larger scale. Fragile areas, such as nature reserves, biodiversity hotspots, heritage sites, river deltas, wetlands, etc, are among the key WEFE Nexus application sites.

Objective 2.1: Upscaling demonstration WEFE Nexus applications to mainstreamed implementation, through appropriate investments and market mechanisms.

Testing WEFE Nexus solutions through demonstration activities is on-going and should continue enhancing understanding and testing of concepts as well as in assessing feasibility, cost-efficiency and effectiveness under different contexts and conditions. By facilitating a deeper comprehension of interlinkages among stakeholders, sectors and spatial domains, these projects are pivotal for

promoting awareness, gathering support, and attracting funding, including by mobilising financing (blended, equity, etc.), for the upscaling of solutions. Moreover, they offer indispensable learning opportunities and feedback for minimising and removing obstacles and for refining related policies, manifesting the added value of the WEFE Nexus approach at local level in the S2S continuum.

Creating the conditions for sharing the capital investment and operating costs among pertinent users as well as accelerating the move towards a market creation through consumers demand, could make these solutions more robust financially (feasible) and attractive for public and private investment.

Directions for action

- 2.1.1. Mapping and brokering opportunities for multipurpose, integrated, and innovative WEFE Nexus interventions and investments.
- 2.1.2. Developing standardized methods to assess the feasibility, cost-efficiency and effectiveness of WEFE Nexus solutions, including their business models, and evaluate their results and benefits potentially through indicators for a benchmark of successful experiences.
- 2.1.3. Piloting and mainstreaming no-regret and cost-efficient solutions and innovative technologies, including Nature-based Solutions and those related to digital transformation, artificial intelligence, space technologies, etc., engaging all appropriate partners, including research partners and the private sector and addressing the digital divide by ensuring that the benefits of digital technology are equitably distributed.
- 2.1.4. Replicating and upscaling of cost-efficient and effective solutions, including by developing an appropriate incentives and financing frameworks, creating enabling legislation, and engaging the private sector, and SMEs in particular, through market approaches.
- 2.1.5. Improving cross-sectoral investment planning to progressively move to cross-sectoral portfolios of large investment projects.

Objective 2.2: Attracting and coordinating increased financing for implementation of WEFE Nexus interventions.

WEFE Nexus implementation requires significant funding as well as new knowledge, horizontal and vertical institutional cooperation, suitable market conditions, and considerable effort and investment in the initial stages. Institutional capacities should be in place to enable related action. The enabling environment for using blended financing and accessing private capital is important.

Directions of action

- 2.2.1. Developing a strategic finance framework for WEFE Nexus implementation – including targets for public and private contributions, cost recovery models, available and emerging financing instruments, role of international development partners, use of blended finance.
- 2.2.2. Prioritizing public spending and mobilizing national sources of finance for WEFE Nexus interventions; reforming harmful subsidies and providing incentives to promote such interventions.
- 2.2.3. Mainstreaming the funding for WEFE Nexus projects through existing cross-sectoral international funding sources, such as climate finance.
- 2.2.4. Using blended finance (including guarantees) to help de-risk WEFE projects in order to attract private sector investment.
- 2.2.5. Strengthen Public-Private Partnerships by integrating financial mechanisms specifically dedicated to biodiversity conservation (e.g. Green Funds).
- 2.2.6. Supporting national, local and regional capacities to prepare schemes and proposals to effectively access and manage domestic and international funding for WEFE Nexus implementation.

Goal 3: Informed decision making based on enhanced science-based knowledge, engagement of capacitated stakeholders, and increased public awareness.

Bridging gaps at the science-policy-society interface, enabling stakeholder leadership, ownership and engagement as well as raising public awareness are key for effective policy development, decision-making and implementation of the WEFE Nexus approach in the S2S continuum. The role of academic and research institutions as well as of the private sector and civil society is important in this regard. The development, collection and exchange of reliable information and sound data, knowledge and experience among stakeholders at all levels is an important prerequisite, as is capacity building of stakeholders.

Objective 3.1: Promoting Science and Education on WEFE Nexus and S2S aspects.

Research and science advancements in WEFE Nexus and S2S domains are key for further refining concepts, describing contents and deepening on priority fields assisting policy development, implementation, monitoring and evaluation, etc.

Directions of action

- 3.1.1. Incorporating WEFE related topics in University curricula
- 3.1.2. Encouraging related cooperation across academic institutes, and linking them with market economy to increase understanding of the interlinkages across the various WEFE components
- 3.1.3. Supporting R&D on emerging and innovative technologies such as Artificial Intelligence and space monitoring. Encourage the use of digital twins in WEFE Nexus
- 3.1.4. Promote cross-sectoral research collaborations on climate-related challenges in the Mediterranean region.

Objective 3.2: Ensuring data availability, harmonisation and sharing across sectors and borders.

Reliable and usable data supports science-based decision making, enabling the informed prioritization of tailored policies, managerial measures, technical solutions, as well as public and private investment decisions. Moreover, it fosters trust among users, enhancing cooperation. Digitalisation provides new tools in that direction.

Directions of action

- 3.2.1 Modernizing, standardizing and harmonizing monitoring systems and databases across the WEFE Nexus sectors including for systematic integration of ecological monitoring and biodiversity indicators.
- 3.2.2 Promoting synergies for the application of new technologies for cost-efficient, advanced monitoring systems.
- 3.2.3 Increasing the engagement and responsibilities of stakeholders in gathering reliable data.

Objective 3.3: Developing capacities of stakeholders and related tools to implement WEFE Nexus at the S2S continuum.

Effective implementation of the WEFE Nexus approach requires stakeholders at all levels to develop new skills and knowledge to be able to work collaboratively across sectors. Education for Sustainable Development should address issues pertinent to system-thinking for the integrated and sustainable management of natural resources and ecosystems, addressed through this Strategy.

Directions of action

- 3.3.1 Identifying capacity building needs for government officials and other national and local authorities, agencies and other stakeholders including private/economic sector, CSOs, NGOs, etc., and prepare capacity building strategies for the aforementioned.
- 3.3.2 Organizing capacity building and training programs including e-learning and massive open online courses, mentoring and peer-to-peer learning, vocational training, etc., for government officials and all stakeholders on priority aspects of the WEF Nexus at the S2S continuum.
- 3.3.3 Promoting sharing of WEF Nexus-related knowledge, experience, skill development and expertise among stakeholders to strengthen evidence-based decision-making and policy formulation.
- 3.3.4 Supporting authorities and other stakeholders by development of competencies, building capacities to identify WEF Nexus interventions, prepare proposals to access and manage international and regional funding to implement these.
- 3.3.5 Developing localized WEF Nexus Assessments and related tools that identify interlinkages and quantify the benefits of joint cross-sectoral actions that reduce trade-offs and enhance synergies.

Objective 3.4: Raising awareness and improving understanding concerning the WEF Nexus at the S2S continuum, stimulating stakeholder's engagement and empowering them for their implementation.

Informed stakeholder engagement supports the development of strong, constructive, and responsive relationships that are critical for the proper understanding, acceptance and ownership of the WEF Nexus at the S2S continuum, facilitating its implementation and monitoring, raising public awareness on the WEF Nexus at the S2S continuum is also of major importance. Decision makers and managers at all levels, civil society, NGOs, women and youth, Members of Parliaments, journalists and private/economic sector are among the targeted focus groups.

Directions for action

- 3.4.1. Developing and conducting awareness campaigns for targeted groups and on tailored made priority elements of the WEF Nexus at the S2S continuum.
- 3.4.2. Supporting engagement, empowerment and decision-making roles of women and youth in WEF Nexus implementation, enhancing the opportunities for their involvement, employment and entrepreneurship.
- 3.4.3. Ensuring that gender considerations and the needs of vulnerable communities are fully taken into account in policy-making and implementation of interventions.
- 3.4.4. Identifying, developing and communicating successful cases of practice into regional, national and local planning processes.
- 3.4.5. Establishing regional Communities of Practice on the WEF Nexus at the S2S continuum.
- 3.4.6. Support behavioral change in consumption patterns, including also in terms of shifting to healthier diets and reducing food loss and waste.

4 Implementation and monitoring framework, and synergies

Several institutions and stakeholder organisations are active on the WEF Nexus agenda in the Mediterranean. Reaching out and engaging the range of WEF partners is critical for achieving the Strategy.

The Barcelona Convention and the Union for the Mediterranean provide, in combination with the relevant EU schemes, solid and complementary institutional and operational mechanisms for co-

ordinately promoting the WEF Nexus uptake. Supported by various existing and eventually new EU schemes, programmes and projects, good practices' sharing, development of flagship initiatives, multi-stakeholder engagement, partners' alignment, donors' mobilization, as well as assistance to countries in setting up appropriate integration mechanisms and advancing implementation of WEF practices should be effectively promoted. Within these, the Mediterranean Strategy for Sustainable Development (2016-2025) led by the Mediterranean Commission for Sustainable Development (MCSD) as well as the UfM Water Policy Framework for Actions 2030 and its Financing Strategy provide engaging processes of state and non-state actors to facilitate institutionalizing the WEF Nexus approach, promoting investment mobilisation, demonstrating the WEF Nexus business case through demos, building capacities and disseminate knowledge, etc. The Barcelona Convention jointly with the Union for the Mediterranean through its WEF Working Group, will provide the light monitoring framework of the WEF Nexus implementation process, aiming to assess progress and strategically orient towards further action for achieving the set goals.

Alignment with and contributions from regional partners would support maximizing the implementation and effectiveness of the process. This includes synergies with, inter alia, institutions like the European Union and its programmes and partnerships (e.g. PRIMA), League of Arab States, Regional Cooperation Council in Southeastern Europe, UN system (like FAO, UNECE, UNESCO, ESCWA, etc.), OECD, as well as partners like GIZ, SIDA, GWP-Med, INWRDAM, Arab Water Council, and with ongoing initiatives/programs/projects, like the GEF UNEP/MAP MedProgramme, EU WES and WES-BCA projects, EU-funded WEF Nexus-related projects, INTERREG NEXT MED Programme etc. The importance of engaging the media, parliamentarians and youth is highlighted.

5 Types of financial means and capacities to achieve the objectives

WEF Nexus approaches may be optimal for achieving several sustainability objectives, directly and simultaneously linked to both mitigation and adaptation to Climate Change while concurrently addressing a range of socio-economic and environmental goals. Though assigning monetary values on WEF Nexus solutions that span across the WEF sectors remains an elaborate task, advancing integrated options are likely to be more cost-effective and cost-efficient at medium and long term compared to isolated silo solutions. Integrated infrastructure planning with eventually considerable investment at the initial stage, typically leads to increased efficiencies, capturing synergies and avoiding duplicated or unnecessary investments. It is important to consider the costs of inaction: isolated sectoral planning may bring harm to other sectors and related costs to rectify it. Incorporating a WEF Nexus lens in available sectoral financial means, while building dedicated WEF Nexus funding lines, could assist meeting objectives within and beyond each sector alone, including as a contribution to climate resilience and health goals, while promoting green entrepreneurship, employment and income generation.

Coordinated domestic, public, private and, where pertinent, international financing are required to advance the WEF Nexus agenda in the S2S continuum. At national level, multi-sector public investment could reduce pressure on individual ministry budgets through shared cost, better risk identification and joint mitigation. Engagement of the private sector, including related to industry, tourism and insurance, is of key importance for advancing the WEF Nexus approach in its own production/operations while influencing its supply chain as well as contributing for society's common benefits. Development banks and multilateral donors should enable WEF Nexus public and private investments through traditional and innovative funding schemes, primarily through blended finance and risk-sharing credit instruments and guarantees. Development assistance should further prioritise

WEFE Nexus action supporting regional and country assessment, multi-stakeholder dialogue, capacity building and, critically, demo applications that will tangibly prove the WEFE Nexus benefits.

Capacities from all entities, sectors and sources should be engaged in a coordinated manner, establishing and servicing a vision for a WEFE Nexus paradigm shift the S2S Mediterranean continuum that will substantially contribute to societal well-being, healthy living and prosperity in the Mediterranean that encompasses social, economic, and political considerations.