The **MARBEFES** project is structured around the concept that biodiversity is a continuous and interconnected system across space and time, beyond traditional boundaries like ‘estuary,’ ‘coast,’ and ‘offshore.’ This approach helps to avoid compartmentalized thinking that might limit our understanding of marine ecosystems. MARBEFES explicitly considers the river-to-ocean gradient, **utilizing 12 Broad Belt Transects (BBTs)** across the four main marine regions of the EU – the Arctic, Baltic, Atlantic, and Mediterranean. These transects serve as the core of MARBEFES research, providing data to understand biodiversity trends and their impacts across Europe.

Over recent decades, studies of European coastal seas have shown diverse responses to global changes. MARBEFES acknowledges that there is no universal reaction of marine ecosystems to environmental pressures, nor a one-size-fits-all management solution. **The project aims to capture this variability, recognizing that shifts in biodiversity** bring both positive and negative consequences. For example, while some areas experience biodiversity gains, this does not always equate to ecosystem health, as seen in the Arctic’s vulnerability to climate change and the Mediterranean’s influx of non-native species.

The overall aim of MARBEFES is to establish clear links between biodiversity, ecosystem functions, and the societal benefits they provide. This is achieved through an innovative suite of ecological, economic, and socio-cultural tools, enabling a comprehensive valuation that supports sustainable policy and governance for marine ecosystems. MARBEFES seeks to go beyond current knowledge by analyzing the causes and consequences of biodiversity changes and assessing how these affect the ecological and economic value of European seas.

With the involvement of **23 experienced partners**, the project is structured to foster interdisciplinary collaboration. It combines natural sciences, like biology, genomics, and oceanography, with economics, social sciences, and the humanities. **This multidisciplinary methodology applies the “Double Diamond” approach**, which guides the project through stages of problem identification, definition, solution development, and dissemination of tested solutions. Each stage allows the project team to refine their tools and findings, ensuring they are relevant and effective for a broad community of stakeholders.

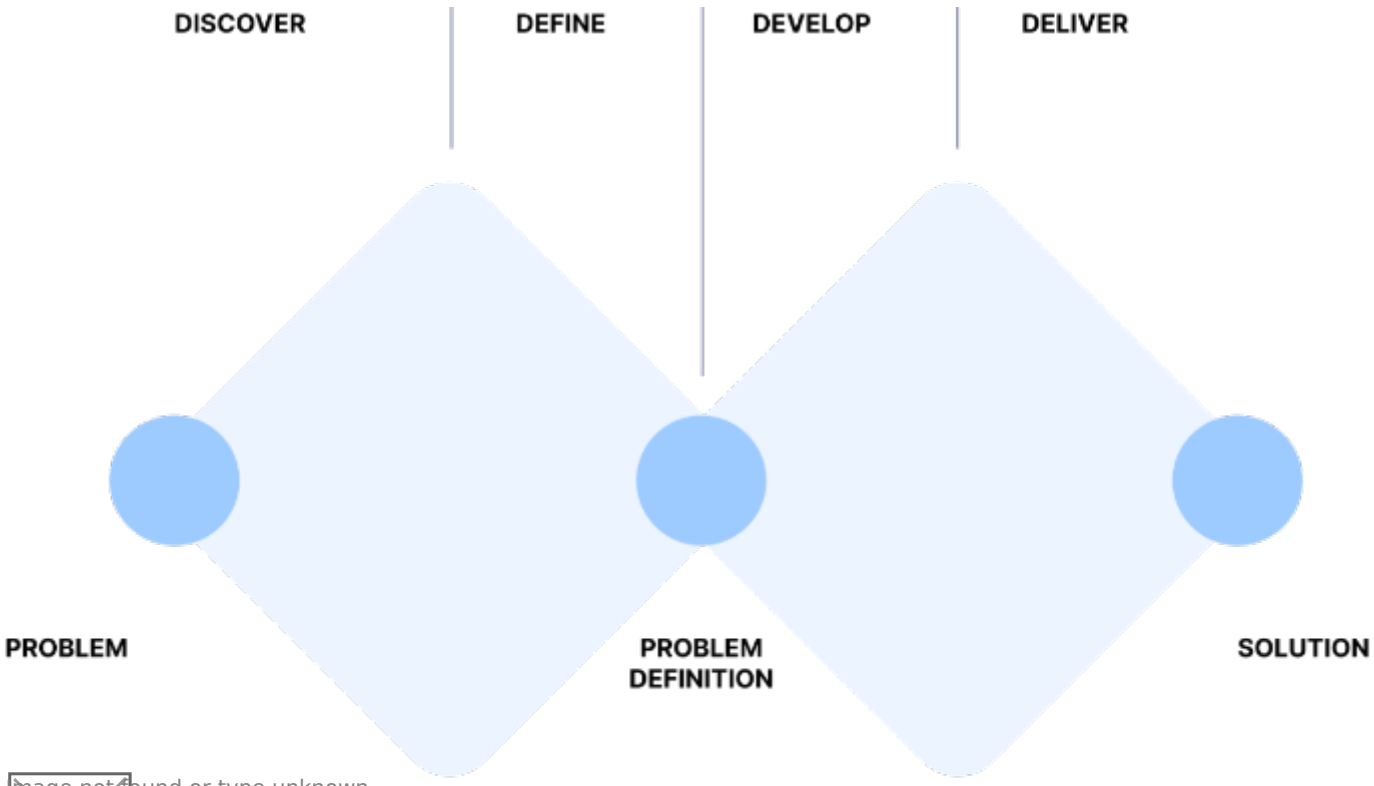


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*Figure SEQ Figure * ARABIC 1. The ‘Double Diamond *foundation of MARBEFES*
(original concept The Design Council, UK, 2005)



MARBEFES operates through a co-creation and multi-actor framework, involving non-expert participants in the decision-making process to create practical and widely applicable results. This iterative, transdisciplinary approach encourages mutual learning across disciplines, providing flexibility to adjust methods and outputs as new insights emerge, making the process both effective and cost-efficient.

The project **acknowledges multiple ways to value biodiversity**: through economic measures, cultural importance, and intrinsic ecological worth. While monetary valuation is common, MARBEFES also emphasizes cultural value and ecological

significance, noting that the natural world has inherent worth beyond human needs. For example, “blue carbon” – the role of marine ecosystems in carbon sequestration – is an ecosystem service with both ecological and climate regulation importance. However, knowledge gaps remain, particularly regarding aquatic ecosystems, which MARBEFES aims to address through improved modeling and understanding of ecosystem relationships and feedbacks.

In summary, **MARBEFES seeks to advance our understanding of marine biodiversity and its valuation, equipping policymakers and stakeholders with tools to protect and manage marine resources** for the benefit of current and future generations.

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