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Measuring Climate Adaptation in Maritime Spatial Planning: Participatory Cartographies within the SWAP Methodology

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As climate change accelerates, ocean acidification and rising sea temperatures are among the most critical drivers of ecological degradation, disrupting marine habitats and accelerating biodiversity loss across coastal and marine ecosystems. In this context, Maritime Spatial Planning (MSP) represents a key governance instrument for addressing cumulative environmental pressures and guiding climate adaptation in marine spaces. However, the effectiveness of MSP depends not only on the integration of scientific data and sectoral priorities but also on the meaningful inclusion of diverse knowledge systems and stakeholder perspectives within a broader ocean citizenship framework.

This contribution examines the Scenario Workshop and Adaptation Pathways (SWAP) methodology as a participatory methodology for operationalising climate adaptation within MSP, with participatory cartography embedded as a core component. Within this framework, SWAP aligns indicators derived from scientific knowledge with stakeholders' insights and expectations in order to translate climate data into actionable strategies. Its core objective is to embed climate adaptation and mitigation measures into MSP by engaging public institutions, maritime sectors, and local communities in the co-production of knowledge and the joint development of adaptation pathways. Through structured dialogue, collaborative mapping, and scenario-building exercises, the process addresses regional marine climate risks, such as ocean warming and acidification, that drive biodiversity loss and threaten both ecological integrity and key economic activities, including aquaculture, fisheries, maritime transport, and tourism.

Drawing on recent research in participatory mapping, critical cartography, and conflict-sensitive spatial planning, the contribution argues that participatory cartographies within the SWAP process function as tools that connect adaptation processes, outputs, and emerging outcomes, and that can be mobilised as qualitative and spatial indicators within adaptation monitoring frameworks. By integrating local observations, expert knowledge, and future-oriented scenarios, participatory cartographies make visible spatial vulnerabilities, ecological trade-offs, and contested priorities that are often overlooked in top-down assessments within MSP processes.

The contribution builds on experiences from the INCORE-MED project, with particular attention to the SWAP workshops to be implemented in Northern Sardinia in February 2026. SWAP workshops,

which include climate risk perception maps, are discussed as instruments for adaptation monitoring, evaluation, and learning (MEL), capturing local knowledge, risk perceptions and spatial prioritisations, and reflecting governance arrangements. The contribution concludes by synthesising the workshops' outputs and outlining recommendations for embedding SWAP methodologies into MSP and adaptation assessment frameworks, supporting more inclusive and policy-relevant approaches to measuring climate adaptation.