Real-world laboratories facilitate progress toward ocean solutions

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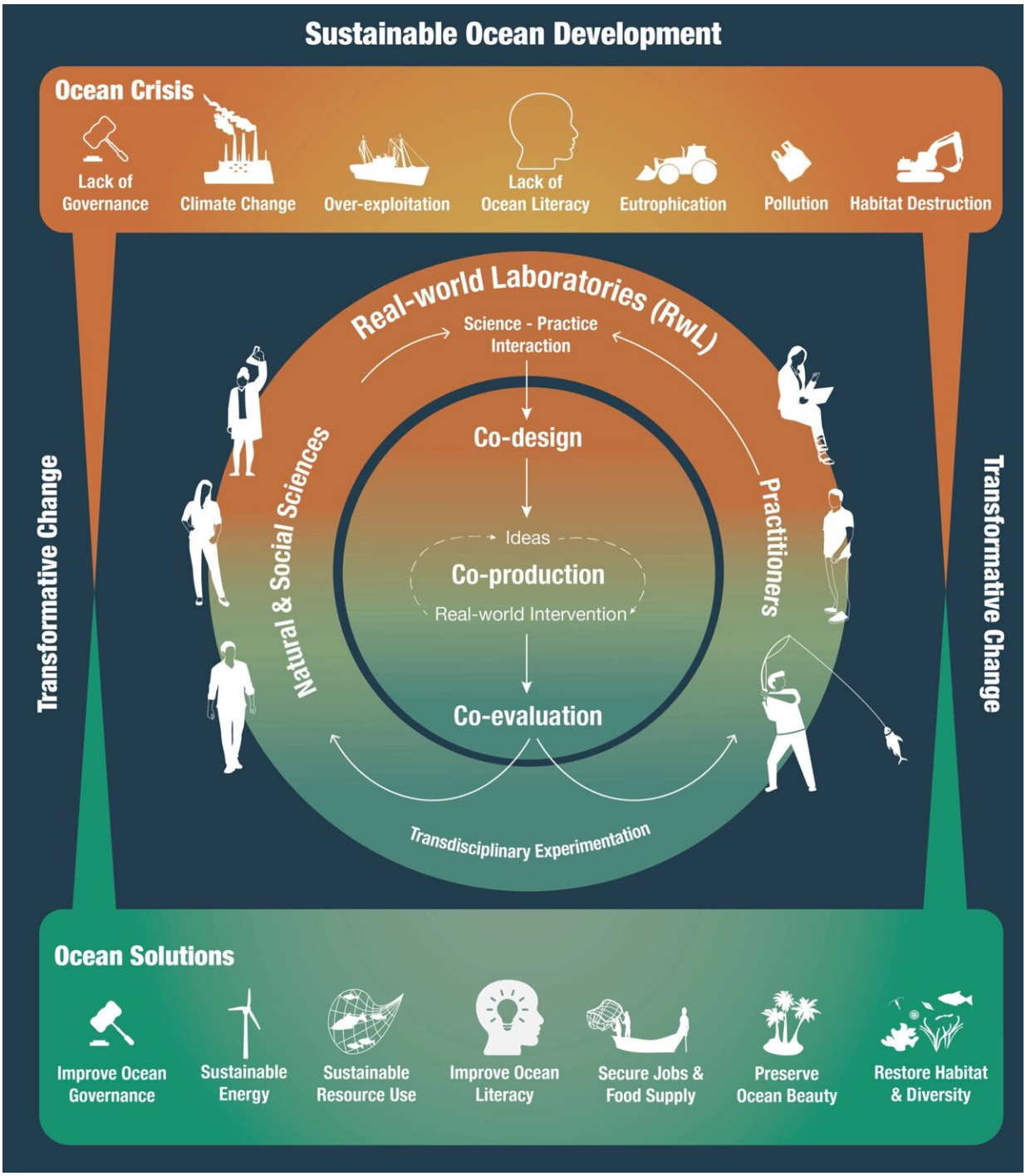

Applying the cyclical real-world lab concept (based on Wanner et al, 2018) in the context of marine sustainable development can foster transformative change leading to ocean solutions. Credit: *People and Nature* (2022). DOI: 10.1002/pan3.10412

Real-world laboratories may be a promising participatory research method for exploring options to protect and use our oceans sustainably. They can be described as a set-up of a research infrastructure in which scientists and other stakeholders jointly invent and conduct experiments to produce knowledge for a more sustainable development of society.

This means working with communities at a specific site to develop potential marine solutions (in a kind of "lab" setting). As such they could be a tool for helping to meet the mission of the "United Nations Decade of Ocean Science for Sustainable Development" of working toward "transformative ocean science solutions for sustainable development, connecting people and our ocean."

An interdisciplinary group of authors now illustrates how deploying the method of real-world labs could be advantageous when having to deal with multiple, overlapping challenges addressed by the Ocean Decade. Their article, "Making the UN Ocean Decade work? The potential for, and challenges of, transdisciplinary research & real-world laboratories for building towards ocean solutions" has been published in the journal *People and Nature.*

The ocean crisis affects public health and well-being

The oceans and our societies worldwide are inextricably linked. The marine environment provides food and energy, facilitates trading and transport of goods, generates jobs and is essential in securing human health, well-being and prosperity. According to the Food and Agriculture Organization of the United Nations (FAO), fisheries and aquaculture form the basis of livelihood provision for more than 10% of the world's population and in many countries fish and seafood are an essential source of protein.

However, human pressures such as climate change, pollution and habitat

destruction have affected our seas and coasts for a long time. Moreover, the Blue Economy, including sectors such as fisheries, aquaculture, tourism, underwater mining and shipping, is largely set up in an unsustainable manner. All these pressures endanger the health of marine ecosystems. Consequently, the world faces an unprecedented loss of marine life in various marine ecosystems, affecting not only the ocean but also public health and well-being. Therefore, there is an increasing demand for finding solutions to sustainably manage oceans and coastal areas.

Societal transformation involves participation of all relevant stakeholders

"The core challenge is that the 'right' solutions cannot be easily found because our abilities to predict complex systems are limited. What may be 'right' for one set of actors using the marine environment, might be different to another," says Dr. Kimberley Peters, professor for Ocean Governance at the Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg (HIFMB), Germany.

In their publication, the team of social and natural scientists therefore argues that solution-oriented research approaches must enable the involvement of everyone with stakes in the future of our marine environment and its resources. In their view, real-world labs are a promising approach because they have the potential to facilitate and guide successful knowledge exchange at the interface of science and society.

One core element of real-world labs is participation of all relevant stakeholders, but on-site, where the marine issues at stake, take place. Practitioners and scientists jointly develop and test potential strategies and options to tackle local challenges in a transdisciplinary process of co-

designing research questions, co-producing knowledge and co-evaluating the results.

"The approach can be especially helpful in coastal areas that are heavily used for various activities ranging from artisanal fisheries to tourism potentially leading to conflicts of interest between different users and stakeholders," explains Dr. Andrea Franke, lead author and postdoctoral researcher at the HIFMB.

But real world-labs can also be helpful, for example, when planning offshore wind farms or Marine Protected Areas (MPAs) where—just like in coastal areas—a variety of economic, social and environmental interests may collide.

The real-world lab method, the authors summarize, might not only be a helpful tool to improve ocean governance and Blue Economy practices but also to address the challenges of the UN Ocean Decade including to "protect and restore ecosystems and biodiversity," "sustainably feed the global population" and "change humanities relationship with the ocean."

More information: Andrea Franke et al, Making the UN Ocean Decade work? The potential for, and challenges of, transdisciplinary research and real-world laboratories for building towards ocean solutions, *People and Nature* (2022). DOI: 10.1002/pan3.10412

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