



## FORM – OCEANEXT 2019

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PHOTO



**Prof. Dr. Bela H. Buck** is engaged in projects regarding off-shore and multi-use aquaculture related to technology, biology, legislation and ICZM issues within the German Bight. Bela H. Buck is involved in various projects concerning the cultivation of marine plants/animals, the development of technological design and the realisation of pilot projects to commercial enterprises. He is in cooperation with various national/international institutions. Bela H. Buck is honorary president of the German Aquaculture Association, a member of the steering committee of the German Agricultural Research Alliance (DAFA) and the chair of the ICES Working Group of Open Ocean Aquaculture (WGOAA). For more details see: <http://www.awi.de/MAQ>

Selected References (with links) :

[Buck BH, Grote B \(2018\)](#) Seaweed in High Energy Environments: Protocol to move *Saccharina* Cultivation Offshore. In: Charrier B, Wichard T, Reddy CRK (Eds.): Protocols for Macroalgae Research. CRC Press, Taylor & Francis Group.

[Buck BH, Langan R \(2017\)](#) Aquaculture Perspective of Multi-Use Sites in the Open Ocean: The Untapped Potential for Marine Resources in the Anthropocene (Eds.). Springer. ISBN(1): 978-3-319-51157-3

[Buck BH, Troell M, Krause G, Angel D, Grote B, Chopin T \(2018\)](#) State of the art and challenges for multi-trophic offshore aquaculture. *Frontiers of Marine Science* 5: Article 165 (21 pages)

Schupp MF, Bocci M, Depellegrin D, Kafas A, Kyriazi Z, Lukic I, Schultz-Zehden A, Krause G, Onyango V, Buck BH (accepted). Towards a Common Understanding of Ocean Multi-Use. *Frontiers of Marine Science*

## Abstract (300 words) :

With the convergence of ecological, social licence, and aesthetic concerns, aquaculture, which has already competed with other established and accepted uses for space, has increasing difficulty expanding into coastal waters. Given the constraints on the expansion of current production methods, it is clear that alternative approaches are needed to enable the marine aquaculture sector to make a meaningful contribution to global seafood supply. Farming of aquatic species in offshore marine waters has been identified as one potential option for increasing seafood production and has been a focus of international attention for more than a decade. Although there are technical challenges for farming in the often hostile environment of the open ocean, there are sufficient reasons to promote the development of offshore farming. Benefits of open ocean waters include; large space for expansion, enormous carrying and assimilative capacity, fewer conflicts with many stakeholders, lower exposure to human sources of pollution, the potential to reduce some of the negative environmental impacts of coastal fish farming, and mostly optimal environmental conditions for a wide range of marine species. The drivers for open ocean aquaculture (OOA) are not only linked to food, trade, and the technology industry. Additionally, there are powerful social and ethical concerns afloat as many Western nations import most of the seafood they eat, and export most of what they catch or produce. This “food insanity” ensures that these nations are to date far too dependent on imports from aquaculture from other nations. Unfortunately, in many production countries aquaculture is threatened by coastal urbanization, industrialization, water pollution, and overall environmental degradation. Hence, aquaculture dependent countries need to endorse, to a greater extent moral and ethical responsibility to develop large scale OOA to feed their own people and not take these valuable foods from undernourished, food scarce nations. While there is a great deal of moving food production offshore, even there space is limited. Therefore, another concept was suggested

already 20 years ago: multi-using existing infrastructure such as oil & gas platforms, which already reached the end of their expected lifetime, as well as offshore wind farms. However, what still needs to be learned is that there are still many unknowns and challenges with regard to multi-use economics, engineering of adequate system design, O&M as well as liability aspects including insurance and ownership and finally social views and stakeholder acceptance.