CHAPTER 4

A NEW APPROACH – THE USE OF PHOTONIC SENSING IN THE FIELD OF AQUACULTURE, FISHERY, AND MARINE RESEARCH

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INTRODUCTION

The protection and sustainable use of marine resources require a better understanding of our oceans and marine ecosystems. Feeding and providing livelihoods for an exponentially expanding world population, while striving to reduce inequality and support gender equity, represent the main challenges of our era and the ultimate targets of the United Nations Sustainable Development Goals [1]. The countries of the region are characterized by densely populated coastal areas and are among the countries of the world with the highest demand for fish protein [1]. Sea related human activities and the fact that almost 50 % of the European population is living within a range of less than 50 km to the coast are calling to intensify our efforts on a broad European basis.

Several factors effect the sustainability of marine fisheries, including increased pollution from human activities, habitat degradation, the introduction of non-indigenous species, overfishing and the impacts of climate-driven changes on the marine environment and its ecosystems[1]. In order to ensure a balance between social development and the long-term protection of our livelihoods, new strategies and technologies are needed to improve the monitoring, understanding and assessment of processes and process dynamics in nature. However, the impact of global change, the intensive use of natural resources and complex interactions between humankind and the environment show different effects on different scales. Especially with regard to the process dynamics and heterogeneity of ecosystems, a comprehensive monitoring of these effects remains to be a challenging issue. In the field of fishery and marine research, this results in the need to develop adaptive survey and monitoring strategies to observe even complex ecosystems of large scale and over a longer period. The dramatic ecosystem changes that have recently occurred, especially in the Black Sea over the past few decades, confirm

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