



## MASTER THESIS PROJECT

# *Vibrio*. More than just a bacterium

IRAITZ JAUREGUI TOLOSA

Basque Centre for Climate Change (BC3)

Leioa, Bizkaia

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## Abstract

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Infectious diseases caused by waterborne bacterial pathogens like *Vibrio* that naturally inhabit the coastal aquatic environment are increasing. The coastal zone and the coastal ecosystems are one of the main pressured ones by global anthropogenic changes such as climate change and pollution. In this context, it is essential to decipher under a systemic approach and under the “One Health” framework the complex and interlinked interactions between infectious diseases, the coastal aquatic environment and the changes that is subjected to. A critical review of the literature and the development of a model based on the Driving Force–Pressure–State–Exposure–Effect–Action (DPSEEA) framework have been carried out for *Vibrio*-associated infections. The proposed DPSEEA model can be used as a tool to identify key health and environmental indicators and identify key areas of intervention or action for policymakers and involved stakeholders. Therefore, this master thesis is an attempt to build a foundation for future research to investigate different adaptation options and identify potential actions to reduce human health and marine organisms’ risks from *Vibrio*-associated infections. Both climate change and pollution interact with *Vibrio*-associated infections by similar mechanisms; (i) altering the environmental determinants that have a role in the host-pathogen interaction; (ii) increasing *Vibrio* virulence and antimicrobial resistance (AMR) profile; and (iii) altering and diminishing the immunocompetence and the capacity of the hosts to fight against infections. All of this results in an altered state of the environment where *Vibrio* is more abundant and distributed, more virulent and more resistant and the hosts that can be infected, marine organisms and humans, are more immunocompromised and therefore more susceptible to infections by *Vibrio*. The model based on the DPSEEA framework for *Vibrio*-associated infections captures and conceptualizes these complex linkages and mechanisms of interaction in a cause-effect relationship. Consequently, it provides links between human health and the environment regarding *Vibrio*-associated infections to facilitate decision-making and the identification of areas for possible intervention. Now more than ever is crucial to develop models like the one developed in this project to communicate and to help better understand the underlying complexity regarding the connections between the environment, society, and human health.

**Keywords:** *Vibrio*, coastal aquatic environment, infectious diseases, climate change, pollution, cause-effect relationships, DPSEEA.